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**INFORMATION AND COMMUNICATION TECHNOLOGY
ADOPTION AND STAFF PERFORMANCE IN PUBLIC TERTIARY
INSTITUTIONS IN BAUCHI STATE, NIGERIA**

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**DOCTOR OF PHILOSOPHY
UNIVERSITI UTARA MALAYSIA
2019**



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(Title of the Thesis) AND EMPLOYEE JOB PERFORMANCE IN PUBLIC TERTIARY
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ABSTRACT

The global outcry for administrative efficiency in the context of public affairs necessitated some organizations in the Nigerian public sectors to adopt technology as an instrument for effective and efficient service delivery. This study, therefore, investigated the influence of technological attributes on the perception of administrative staff to adopt information and communication technology facilities in their primary responsibilities for effective performance in Bauchi state public tertiary institutions. Data were collected using questionnaires and semi-structured interview questions. After preliminary data screening using SPSS, 382 questionnaires were used in quantitative data analysis, while 8 respondents were interviewed. The respondents were selected from six tertiary institutions in Bauchi state due to its peculiarity with the issue. PLS-SEM was used to analyse the responses generated from the questionnaires while NVIVO was used to analyse the interviews transcribed data using a thematic approach. The study was conducted using a convergent parallel designed of quantitative and qualitative approach. The quantitative approach consists of 16 hypotheses, out of which 12 were supported, while 4 were not supported. The findings of this study demonstrated the significance of the adopted variables as capable of influencing the rational decision of non-teaching staff to improve their performance through actual use of technological attributes. However, the study observed some limitations with regard to the ICT facilities in achieving the needed performance without the fundamental administrative structures as identified in the qualitative analysis. The Implications of the finding are discussed in relation to the theoretical, practical, and methodological postulations. The study contributes to the theory and practice of, information system, public policy, and administration, as well as provides policymakers and top management staff with the understanding of ICT adoption as a panacea to poor staff performance, in public tertiary institutions.

Keywords: ICT Adoption, Staff Performance, Tertiary Institutions, Non-teaching Staff, Nigeria.

ABSTRACT

Sambutan global untuk kecekapan pentadbiran dalam konteks urusan awam memerlukan beberapa organisasi di sektor awam Nigeria untuk menerima teknologi sebagai alat untuk penyampaian perkhidmatan yang berkesan dan efisien. Oleh itu, kajian ini meneliti pengaruh ciri-ciri teknologi mengenai persepsi kakitangan pentadbiran untuk mengguna pakai maklumat dan kemudahan teknologi komunikasi dalam tanggungjawab utama mereka untuk prestasi berkesan di institusi pengajian tinggi awam negeri Bauchi. Data dikumpul menggunakan soal selidik dan soalan temu bual separuh berstruktur. Selepas pemeriksaan data awal menggunakan SPSS, 382 soal selidik digunakan dalam analisis data kuantitatif, manakala 8 responden telah ditemuduga. Responden dipilih dari enam institusi pengajian tinggi di negeri Bauchi kerana keanehannya dengan isu tersebut. PLS-SEM digunakan untuk menganalisis maklum balas yang dijana daripada soal selidik manakala NVIVO digunakan untuk menganalisis data temuduga yang disalin menggunakan pendekatan tematik. Kajian ini dijalankan menggunakan satu selari konvergen yang direka bentuk daripada pendekatan kuantitatif dan kualitatif. Pendekatan kuantitatif terdiri daripada 16 hipotesis, dari mana 12 disokong, sementara 4 tidak disokong. Penemuan kajian ini membuktikan kepentingan daripada pemboleh ubah yang diterima pakai sebagai mampu untuk mempengaruhi keputusan rasional kakitangan bukan mengajar untuk meningkatkan prestasi mereka melalui penggunaan atribut teknologi sebenar. Walau bagaimanapun, kajian ini meneliti beberapa batasan berkaitan dengan kemudahan ICT dalam mencapai prestasi yang diperlukan tanpa struktur pentadbiran asas seperti yang dikenal pasti dalam analisis kualitatif. Implikasi temuan dibincangkan berhubung dengan postulasi teori, praktikal, dan metodologi. Kajian ini menyumbang kepada teori dan amalan, sistem maklumat, dasar awam, dan pentadbiran, serta menyediakan penggubal dasar dan kakitangan pengurusan tertinggi dengan pemahaman tentang penggunaan ICT sebagai ubat penawar kepada prestasi kakitangan yang lemah, di institusi pengajian tinggi awam.

Kata kunci: Penerimaan ICT, Prestasi Staf, Institusi Pengajian Tinggi, Kakitangan Bukan Mengajar, Nigeria.

ACKNOWLEDGEMENT

With much grateful, I begin by expressing my intense gratitude to Allah the Almighty, Utmost Compassionate and Extreme Merciful, who, within His confine wisdom guides and make this academic dream of success a reality. I am greatly indebted to my supervisors, Dr. Mohd Nazri Bin Baharom and Dr. Nik Abdur rahaman Adeziriaman for their their immeasurable contributions at every step of this study, to its efficacious completion. I am, therefore, indebted to the Chairperson and the members of my Viva Voce Panel namely Professor (Dr.) (Chairman/person); Professor (Dr.) (External Examiner); Dr. (Internal Examiner) for their cherished contributions. It is similarly relatable to appreciate and acknowledge quite a number of people that in one way or the other contributed to the achievement of this research work. Appreciation to Associate Professor (Dr.)..... (Chairman PD); Associate Professor (Dr.) Halima Bin.....; Associate Professor (Dr.) Khairi Bin..... (SMTTC); Professor..... (Chairman Colloquium); Dr. (Ahmed Niger's supervisor) for their gigantic contributions, specifically at the early stage of this work. Distinctive thanks to Madam Asyikin, Mr A Butt, Mr....., Madam Noor Fatimah Hashim, Mahdi Mansor, Mohd Noor, Nur Atika Zakaria, Siti Nazirah Zainuddin and all academic and management staff of College of law, Government and International Studies (COLGIS) for their support and assistance. Special thanks to staff ATBU Bauchi, BASUG, State Poly Bauchi, ASCOEA, CLIS Misau, SOHTECH Ningi, especially: Provost (Dr.) Nasiru Mohd Isyaku, College management team, COEASU and NASU members, Mr. Tunday Ibinola, Tata Umar Saad Malam Ibrahim, Babangida S. Shanu, Abdulhamid Moh'd, Arisco family, Umar Isma'il, Auwal M. D. Umar, Babawo Fady, (Abokin Ibrahim) Mr. Christ, Abdulkadir Azarema for their tremendous assistance while collecting the data and other process of this research. Exceptional appreciation to my beloved parent(s), (late) Malam Ibrahim Maidoki, (late)Malam Dahiru Shakallo, (late) Alhaji Dahuwa Zimbo and caring mother, Fatima Dan'Budur Dogari for their parenting. I am also grateful to my concerned brothers and sisters, especially, Zuwaira, Adamu, Talatu, Dan'Azimi, Sambo, Balki, Amina, Innah,

Ladi, Sabuwa, Adama, Lamindo, Rabe, Umaru, Ibrahim and Tanimu, including the entire members of our family, for their moral and financial supports. I also thank and appreciate the effort of my friends and colleagues in Nigeria and Malaysia, especially, the one and the only Alhaji Aliko Muhammad Kankani who treated me like a blood brother, among others, Farito, Mahmud, Sadiq, Dan'liti. Fauzi, Babani, Bako, Ahmed T.D., Dan'Adda, Bature, Auwalu, Yakubu, Abdulkadir, Mustapha, Jamilu, Rufa'i, Dr. Yusuf, Dr. Madu, Dr. Ahmed Sabo, Dr. Asma'u Dutse, Dr. Nura, Dr. Abubakar, Dr. Muntaha, Dr. Abbayi, Dr. Sule Musa, Dr. Rasheed, Dr. Lawi, and many others too numerous to mention, being sources of inspirations.



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LIST OF ABBREVIATIONS

AAU	Association of African Universities
ASCOE	Aminu Saleh College of Education
ATAP	Abubakar Tatari Ali Polytechnic
ATBU	Abubakar Tafawa Balewa University
ATCON	Association of Telecommunication Organization of Nigeria
ATU	Attitude toward Use
AU	Actual Use
AVE	Average Variance Extracted
BASUG	Bauchi State University Gadau
B. Sc.	Bachelor of Science
CIA	Criminal Investigation Association
CLIS	College for Legal and Islamic Studies
DV	Dependent Variable
E-LA	Electronic Learning
GETAMEL	General Extended Technology Acceptance Model for E-Learning
GSGSG	Ghazali Shafie Graduate School of Government
IV	Independent Variable
ICWE	International Conference Workshop and Exhibitions
ICT	Information and communication technology
ITAN	Information technology Association of Nigeria
IT	Information Technology
ITU	Intention to Use
MIMIC	Moderately Indebted Middle Income Countries
MoU	Memorandum of Understanding
M. Sc.	Master in Science
NCA	Nigeria Computer Society
NCCE	National Commission for Colleges of Education
NCS	Nigerian Computer Society
NeGST	National E-Government Strategy
NIPOSTS	Nigerian Postal Service
NITDA	National Information Technology Development Agency
NITEL	Nigerian Telecommunications Limited
NUC	National University Commission
NVIVO
PEU	Perceived Ease of Use
P.U.	Pedophiles United
PHCN	Power Holding Corporation of Nigeria
Ph. D	Doctor of Philosophy
PLS-SEM	Partial Least Square, Structural Equation Model
PU	Perceived Usefulness
SI	Social Influence

SMT	Scientific Management Theory
SOH&TECH	School of Health and Technology
SPSS	Statistical Package for Social Science
SP	Staff Performance
TAM	Technology acceptance Model
TETFund	Tertiary Education Trust Fund
TPB	Theory of Plan Behavior
TRA	Theory of Reasoned Action
UNESCO	United Nations Educational, Scientific, and Cultural Organization
USA	United State of America
USAID	United States Agency for International Development
UTAUT	Unified Theory of Acceptance and Use of technology
UUM	Universiti Utara Malaysia



CHAPTER ONE: INTRODUCTION

1.1 Introduction

The global clamor for organizational efficiency today, necessitated organizations the use of current technological gadgets, which become indispensable as per as public and private sector operations are concerned. It has been realized that both private and public organizations required an indispensable power of information and communication technology (ICT), which possesses all the necessary tools as well as societal demand, required to support workers' performance (Jasen, 2012).

The development of ICT tools was presented as the solution to tedious paper works, disorganization, inefficiency, mal-administration, embezzlement and bureaucratic bottleneck in various strata of authority particularly in higher institutions of learning. Prompt changes of the dynamic world show the influence and importance of technology in all aspects, particularly in the parts of learning life. Tertiary institutions of industrialized nations considered this progress as ample opportunities to technological inventions within the academic environment. Developing nations, struggling to be in the same way in the international markets, under a great burden to equally surround suitable blends of technologies within their academic curriculum methods, and therefore enhance and invent their learning experiences. Even though many institutions of higher learning all over the world have embraced internet-based learning systems in the achievement of their maximum performance in a wider understanding of the end user acceptance process (Aswan, Ahmad, and Smedley, 2013).

The rapid step of globalization joined with the revolution in information technology has inspired governments across the globe to progressively embrace e-services in the delivery of statutory responsibilities in the public domain (Asogwa, 2013). The e-applications have infused into all sectors of the economy and are increasingly becoming the cornerstone of government operations in developing nations and consequently changing the orientation, instruments, trajectory, ideologies, management style and patterns of communication within and outside government (Cuong, 2011; Ndou, 2004).

Tertiary institutions are dominant to the creation of the intellectual volume in which knowledge, invention and application rest on and to the upgrade of lasting learning practices. Additional good progress is the scientific improvement and the beginning of different types of tertiary institutions and new forms of struggle, thus traditional institutions to modify their ways of action and delivery and take Advantage of chances obtainable from ICT. But this technological change also transmits the risk of constructing a developing digital divide among and within nations. Equally, the majority of developing and transition nations continue to fight with difficulties formed by insufficient answers to long-lasting challenges confronted by their tertiary education systems. Surrounded by these animated encounters is the sustainable extension of tertiary education coverage, the decrease of imbalances of access and results, the development of educational excellence and applicability, and the introduction of more effective governance arrangements and administrative practices, Salmi (2015).

More so, the key reason for the fresh report by the World Bank is to investigate the starring role of tertiary education in constructing up a nation's ability to convert to a knowledge society (Salami, 2015). These are the focal messages illustrated in table 1.1 as follows:

Table 1.1
Report on the role of tertiary institutions in the society.

SN.	The Purpose and Structure of World Bank New Report
1.	Economic and social progress is accomplished essentially through the application and advancement of knowledge.
2.	Tertiary education is essential for the creation, distribution, and application of knowledge, as well as for the construction professional and technical capacity.
3.	The tertiary education systems of most transitions and developing countries are not sufficiently ready to play this role, which places these nations at risk of being more relegated in a greatly competitive economy.
4.	The government has an accountability, to put in place a permitting framework to inspire tertiary education institutions to be more pioneering and responsive to the requirements of a global competitive knowledge economy and to the changing labor market necessities for human resources.
5.	The World Bank can help its client nations in the illustration on worldwide experience and in mobilizing the capitals wanted to improve the responsiveness and effectiveness of their tertiary education systems.

Source: World Bank, 2012

The essential part of the global development goal is information and communication technology (ICT), (Adeoye, Oluwale, & Blessing 2013). Therefore, within the globe, in the 21st-century information and communication technology (ICT), is playing a vigorous role in shaping education and contributed immensely to the progress of the tertiary institutions (Yeboah, Kwarteng, & Djan 2013).

In the same vein, the attainment of these desired goals heavily relies on the embracement of the tertiary institutions' staff of ICT for the benefit of effective administrative performance. In 2001 for example, the Association of African Universities (AAU) launched a project called "the use of ICT in African Higher Education Institutions". This was followed by a new project in 2006. AAU had been successful due to one of its agreement with a Union (AfriNic) that for any acquisition of IP resources there will be a discount of 50%. For all African education and research institutions (AAU, 2009). Together with AAU initiatives, e-learning Africa (e-LA), an annual event hosted by international conferences, workshops and exhibitions (ICWE), is another commendable job on promoting e-learning.

The relationship between staff performance and Information and communication technology (ICT) has a significant starring role to play in facilitating a good management in tertiary education institutions, manufacturing to succeed complex information streams and to integrate them towards effective and efficient educational design and development. The relationship holds pronouncing potentials in supporting and boosting current education as well as nationwide progress efforts in Nigeria (Adeyemi, Idowu and Esere, 2013).

Nonetheless, the evolutionary stage of the e-applications in Nigeria, was in both public and private sector organizations. This e-application in the public sector also recognized as e-government is in developing stage and is the only commencement to be researched (Amagoh, 2015). Example of areas getting attention on e-application in

public sector comprise e-learning (Edewor, Imhonopi, & Urim, 2014; Ayeni & Odion, 2011), e-recruitment (Odumeru, 2012; Omolawal, 2015; Sanusi, & Martadha, 2012; Sanusi & Mohamed, 2012) and e-licensing (Obidinnu, Ekechukwu, & Ejiofor, 2013; Faniran & Olaniyan, 2009).

In order to gain the potentials of ICT for staff and organizational development, Nigerian government evolved national information and communication technology policies as an agenda for ICT integration in all aspects of life. Subsequently, it adopts e- government initiative refers to as “National e- Government Strategy” (NeGSt) (Obasanjo, 2003) to facilitate the use of ICT infrastructure and enhancement of public service delivery, such as higher productivity, economic growth, foster national competitiveness, combating crime and the attainment of the vision 2020 (Asagwo 2013).

More so, institutions of learning, especially tertiary education institutions, can be known as education next to the conclusion of the secondary school knowledge. Tertiary institutions as universities and institutions that teach particular volumes of higher education, such as colleges, community colleges, technical training institutes, research laboratories, nursing school, distance learning, and centers of excellence. Higher institutions are taken to comprise postgraduate education and an undergraduate, while vocational education and teaching beyond post-primary are known as advance education in the United Kingdom, or continuing education in the United States, De Witt, (2009). Staff of tertiary institutions play an important role

in a field of acquiring education and awarding of Diplomas and academic degrees' certificate. The usage by staff of information and communication technology (ICT) aided curricular activities in teaching and learning environment today, (e-learning) (World Bank, 2011).

Therefore, despite the apparent potentials of tertiary institutions' staff, e-service system adoption in relation to how it affects the system in Nigerian tertiary institutions is only beginning to be researched and understood. This study adopted mixed method of research to examine the adoption of ICT on staff performance in tertiary institutions. The study established a model of staff performance in ICT adoption. It also discovered factors that impose service costs in relation to ICT adoption. The study is designed to extend the existing body of knowledge related to ICT adoption and staff performance. Meanwhile, below is the problem statement of the study.

1.2 Problem statement

Staff performance is a major requisite for enhancing general effective and efficient office administration. The problem this work intends to address, is the apparent persistent and complex challenges that lead to inefficiency, confronted by the Nigerian educational institutions, especially in the area of ICT in tertiary education institutions (Akuh 2016). In terms of deprived technical infrastructure in Nigeria; the problem of epileptic or insufficient electric power has further worsened the situation. Likewise, financial limitations are behind the ICT equipment cost can be a restrictive factor with regards to the attainment of a broad aim audience and ensuring that every person can

afford this service. So also misappropriation of funds has supplementary to the continuing problem (Anene, Imam, & Odumuh, 2014). These dominant challenges of Nigerian Tertiary Institutions were persistently becoming a national issue.

Recently, on June 3rd, 2016, the Nigerian Minister of Education, Mr. Adamu Adamu, decried on the pathetic state of the Tertiary institutions, particularly Universities (Odiaka, 2016). Series of events explains the decay of the higher educational institutions in Nigeria which necessitates stakeholders meetings, educational summits, conferences, and seminars among others (Agboola 2013). Buttressing the minister's query, Yeboah, Fosu, and Djan (2013); Adeyemi, Idowu and Esere (2013) lamented that ICT holds pronounced potentials in supporting and boosting current educational as well as nationwide progress efforts in Nigeria, but, quite a lot of challenges persist. These challenges include: these illustrated in table 1.2, indicating challenges of ICT in tertiary institutions.

Table 1.2

Nigerian challenges of ICT in Tertiary Institutions

SN.	Problem	Explanation
1.	Resistance to change	From traditional educational methods to more advanced, teaching and learning technology-based methods, by both students and academics. The approaches of many managements in and outside institutions headed for the development of ICT interrelated facilities including the procurement of computers and Internet are rather slow in some instances, and in others they lacked assistances or backing by the government all the time.
2.	Insufficient infrastructure	Such as Computer hardware, software and bandwidth/access.
3.	Absence of competent personnel.	Majority of the institutions lack computer knowledgeable teachers and ICT professionals that would backing and achieve the Internet connectivity

and application of computing in the teaching/learning process. The cost of tools in a nation state like Nigeria with a maltreated economy and seriously devaluated currency is enormous. On the other hand, it should be well-known that the difficulty might not be the funds or the technology, but rather the will on the part of government and the governors of education.

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|---|---|
| <p>4. Nigeria Lacks the necessary infrastructural facilities to benefit from ICT.</p> | <p>Again, maximum of the ICT infrastructures includes telefax, internet, e-mail is dependent on NIPOST (Nigerian Postal Agency), NITEL (Nigerian Telecommunications Limited), and PHCN (Power Holding Corporation of Nigeria) service station. These services are ineffective in delivery and attract intolerable high bills.</p> |
|---|---|

Source: (Adeyemi, Idowu & Esere, 2013)

Furthermore, there is a widespread crisis in the tertiary institutions in Africa's development in the administrative systems. This can be understood in the scarcity in the number of competent staff and in the complexity of motivated staff who are expert of taking quality management of teaching and learning in a 21st century educational situation. The deficit of the infrastructures associated with the state as well as the equal of illiteracy poses unlimited danger to the learning and general progress of the continent. It is extensively understood that addressing these challenges, needs a variety of interventions. The intervention comprises the incorporation and practice of information and communications technology and adopt full e-administration for effective and efficient service delivery (Osang, 2012).

The use of technology approaches as a mechanism of addressing these challenges of staff performance is a stage in the right way especially in the learning environment. On the other hand, these strategies have not adequately extended access to pre and

post higher institutions of learning, particularly to the rural dwellers in Nigeria. Access to internet skill, great price of computer systems, computer systems non-portability, etc, continual problems to ICT adoption in the staff performance (Boyinbode et al, 2008; Osang, 2012) as cited by (Osang, Ngole, & Tsuma, 2013; Osang, Ngole & Tsuma, 2013).

Similar, low staff performance due to poor Information and communication technology in place, the educational sector in Nigeria has experienced gaps within its system. The absence of actual control has headed to unpredictable struggles in the sides of ineffective learning by students, incompetence teaching and non-teaching staff, and mishandling of funds and the likes (Habil & Jalloh, 2016). Therefore, investigating the ICT adoption and staff performance in Tertiary institutions is an area where additional research is recommended (Legris et al. 2003; Amer et al., 2013). To examine TAM with another sample of user and a broader range of information technology use “The TAM model could be expanded to include additional beliefs that could impact in technology acceptance such as social influence” (Amer et al., 2013 & Legris et al. 2003). TAM should be united into a wider model that recognizes extra variables that influence staff performance. Therefore, this study intends to add social influence (SI) to Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Intention to use (ITU) and attitude toward use (ATU), to serve as additional independent variables that will help to moderate and strengthen the influence on staff performance to be stronger.

More or less, Social influence as described by Venkatesh et al. (2003) is the measure to which persons perceive influences and individuals of significance consider the entities should be by means of fresh technology. He measured social influence with a four -element degree built on the acceptance of six models. The six models comprise of the theory of reasoned action, the TAM-two, the theory of planned behavior, the consumer technology acceptance model, the ideal of individual computer utilization, and innovation diffusion theory. In this study, the dimension of social influence will be measured with the technology acceptance model (TAM).

Davies (1986) introduced Technology Adoption Model (TAM), to enable policy makers, researchers and specialists study the procedure of introducing new technology in the workplace. It works by measuring the attitude of managers with the high opinion to new technology over perceived ease of use and usefulness. The degree of acceptance and adoption of the model in our public institutions remains a topic of debate among the scholars (Asogwa, 2013). So also, TRA insist on the relations between opinions, conducts, as well as manners. TRA is established at the suggestion which a person's over conduct (B) is strong-minded by the person's aim to do that conduct (BI). BI on the other hand is a purpose of two variables, one's approach on the way to carrying out the behavior itself (AB) as well as individual's Personal Custom (SN) (Kautz & Pries-Heje, 1996). Moreover, it also recognizes the incorporation of the scientific management theory founded by Fredrick W. Tylor in 1911, to accommodate the dependent variable, staff performance. Fredrick Winslow Tylor, in 1911, published his work, called "The principles of scientific of management" in

which he pronounced how the application of the scientific method to the management of employees significantly could improve efficiency.

Empirical studies revealed that previous studies on e-government or e-service mainly conducted in public and private organization (Bertel & Harrison 2005; Lucky, 2011; Selene, 2011; Murtaza 2014). Globally, the studies conducted on technology adoption outside Nigeria, focused on comparative analysis male and female (Owusu 2013), political and institutional analysis (Syarkir 2012), Responsiveness versus efficiency (McCamy 2015), Discourse analysis of trade regulations (Bonina 2012), and Nonparametric analysis (Gosarjeva & Umek et al., 2005). Similarly, studies reveal that there is the scarcity of research on the staff performance and ICT adoption in tertiary institutions in Nigeria. The few studies were conducted only in the policy implementation (Nwachukwu et al, 2014); opportunities and challenges (Asagwo, 2013); ICT as the change agent (Adeoye et al, 2013). Also, the study on six selected tertiary institutions in southern Nigeria establishes a significant relationship between ICT resources and public universities and further recommended the adoption of the technology across Nigerian tertiary education to improve staff performance and make education extensively available and accessible at minimal cost.

Specifically, the only study of ICT in Bauchi state tertiary institutions focused on the challenges of ICT on students (Aliyu, 2011). This establishes a clear opportunity to conduct further study on the adoption of ICT and staff performance. Methodologically, the preceding study conducted the research with quantitative

approach to the research, which the method of data collection and analysis is purely Quantitative. This entails that data have been collected through questionnaires (Aliyu 2011). This also addressed a methodological gap in this research to go ahead with the mixed method approach that mode of data collection involved the distribution of questionnaires and face to face interview respectively. According to Creswell (2012), a phenomenon should be studied if it is comprehensive than the preceding one or examine the subject more systematically, methodologically or expansively. The scenarios, therefore, identify gaps and plausible platforms for the researcher to conduct further study on the adoption of new technology and staff performance in the institutions.

This study takes a brief look the at the system of education in Nigeria in particular the tertiary institutions and their recent framework for internal control, problems caused by the poor internal control system, the way forward and ensuring a continuous improvement in the Nigerian educational sector. The study guarantees that adoption of ICT system in Nigerian tertiary institutions to serve as a means of improving staff performance and the quality of education in Nigeria. It also enlightens staff in Nigerian tertiary institutions of the major roles played in the implementation of information and communication technology (ICT) system staff performance and development (Habil & Jalloh, 2016).

1.3 Research Questions

The major questions this study addresses are as follows:

1. Does perceived usefulness (PU), perceived ease of use (PEU), intention to use (ITU), attitude toward use (ATU), social influence (IS) and actual use, influence staff to use office technology for effective performance?
2. Does actual use mediate the relationship between perceived usefulness, perceived ease of use, intention to use, attitude towards use, social influence and staff performance in public tertiary institutions?
3. What are the potential challenges of ICT adoption confronting staff in public tertiary institutions?
4. What are the ICT strategies for improving staff performance in public tertiary institutions?

1.4 Research objectives

The major goal of this study is to assess major technological attributes/characteristics that influences personal traits of administrative staff in the tertiary institutions in Nigeria. The specific objectives set to be achieved:

1. To examine the impact of perceived usefulness (PU), perceived ease of use (PEU), intention to use (ITU), attitude toward use (ATU), social influence (IS) actual use (AU) on influencing staff to use ICT facilities for effective performance.

2. To determine the mediating effect of actual use on the relationship between perceived usefulness, perceived ease of use, Intention to use, attitude toward use, social influence, and staff performance in public tertiary institutions.
3. To explore the potential challenges of ICT adoption confronting staff in public tertiary institutions.
4. To examine the ICT strategies (Remedy) for improving staff performance in public tertiary institutions.

1.5 Hypotheses of the study

Based on the above model and in line with objective of the study, the following hypotheses were formulated below.

- H¹. There is a positive relationship between the perceived usefulness (PU) and staff performance (SP).
- H². There is a positive relationship between the perceived ease of use (PEU) and staff performance (SP).
- H³. There is a positive relationship between intention to use (IU) and staff performance (SP).
- H⁴. There is a positive relationship between attitude toward use and staff performance (SP).
- H⁵. There is a positive relationship between social influence (SI) and staff performance (SP).
- H⁶. There is a positive relationship between actual use (AU) and staff performance (SP).

- H⁷. Actual use (AU) mediates the relationship between the perceived usefulness (PU) and staff performance (SP).
- H⁸. Actual use (AU) mediates the relationship between the perceived ease of use (PEU) and staff performance (SP).
- H⁹. Actual use (AU) mediates the relationship between intention to use (ITU) and staff performance (SP).
- H¹⁰. Actual use (AU) mediates the relationship between attitude toward use (ATU) and staff performance (SP).
- H¹¹. Actual use (AU) mediates the relationship between Social Influence (SI) and staff performance (SP).

1.6 Significance of the study

The significance of this study is that, it seeks to create opportunities and identify the limitations of integration of information and communication (ICT). Administrators shall be acquitted whether investment in ICT will produce worthwhile results. It will also show what further steps need to be taken to enhance the staff performance in institutions of higher learning. It will facilitate ICT knowledge to the staff, which is essential for effective and efficient administrative functions and for teaching and learning in the institutions of learning. Administrators, should have the ICT literacy so as to be able to understand the Information and communication Technology's (ICT) capability and limitations, demonstrate a fundamental knowledge of ICT and their effects on the society. They should have ICT knowledge which is essential for staff performance.

Moreover, this study will show whether staff performance will be boast with ICT integration and facilitate proper administrative functions as well as thus advantageous : cost less in time and money, easier to operate, financial security, financial accountability, information stored centrally and share more easily. The study is equally important as its findings will provide information on how staff performance improved by integration of ICT in in the Tertiary Institutions in Bauchi state, Nigeria. The staff performance will be more influential and deliver. The progressive practice of ICT in the Public institutions will bring about good assessment for staff by attaining efficiencies through integration, connection, and sharing of public infrastructure, systems, and assets.

Adoption and enabling of digital technologies will empower staff, incorporated services and improved data sharing which will bring about significant staff performance; thereby, will enable insight motivated decision making, and will offer a greater user experience and excellence of service delivery.

1.7 Theoretical Contributions

This study adapted Technology Acceptance Model (TAM), which is the classical information system (IS) model established to describe computer usage behaviour and constructs related to acceptance of technology (Fishbein & Ajzen, 1975); Scientific Management Theory which has the strength of explaining conceptual of this study, because its postulations relies on the adoption of scientific tool such as ICT. However,

scientific management is a means to staff improvement as it usage is an ends to staff performance, and assimilates the social influence theory, is a behavior intention theory, which an individual's behavioral intentions are influenced by personal norms as sound as attitude, (Lascu & Zinkhan, 1999). Davis et al., (1989) advised that a model contained elements from both TAM and TRA might offer a more comprehensive view on the basis of user acceptance; to serve as a new variable added to perceived usefulness, perceived ease of use, Attitude toward use, Intention to use and actual use that have not been tested in the setting of improvement of ICT integration and staff performance in tertiary institutions of Bauchi state, Nigeria.

This study has verified and validated empirically the mediating effect of actual use on the relationship between PU, PEOU, ITU, ATU, SI, AU and staff performance, which will contribute in minor measure to the body of knowledge.

This study may be the first empirical study that examined the applicability of ICT and staff performance in tertiary institutions from three senatorial zones of Bauchi state, Nigeria.

1.8 Practical Contributions

This study shall contribute to the stakeholders, the government, tertiary institutions, administrators and lecturers.

1.8.1 Government

The findings of this work could be used by the government to intervene in overcoming present and future problems associated with staff performance in the institutions of higher learning.

Conducting research on the adoption of ICT and staff performance in public tertiary institutions could facilitates researchers, stakeholders and management with essential tools and skills needed towards the attainment of general individual, institutional and organizational aims and objectives.

1.8.2 Tertiary institutions

This study of adoption of ICT in public tertiary institutions is significant, particularly in the area of speedy change such as application of ICT in education, the use of networks and other innovations in ICT to back the smooth movement of knowledge that is essential in improving staff performance and teaching competencies (Albion, Tondeur, & Forkosh-Baruch, 2015).

This study will bring about a significant development in tertiary institutions by increasing learning potentials afforded by ICT that, if effectively utilized will provide an influential students learning experience (Rienties et al. 2009; Lofstrom & Nevgi, 2008). Students are now familiar and more acquainted with the format of communication through social learning tools such as Twitter, whats'app, Facebook and expect these to be replicated in the classroom (Rienties et al. 2012).

1.8.3 Administrators

Assisting management to identify factors that influence the integration of ICT in the public tertiary institutions and to inspire them on the possible ways of enhancing staff performance.

Conducting research on the adoption of ICT and staff performance in tertiary institutions could improve research centers, stakeholders, and management with essential tools and skills needed towards the attainment of individual, institutional and organizational goal.

The findings of this work could be used to overcome present and future problems associated with staff performance in the institutions of higher learning.

1.8.4 Lecturers

The study on incorporation of ICT in tertiary institutions of higher learning will provide an effective training for academic staff, so that they will learn how to effectively and efficiently redesign learning prospects, (Ebert-May et al., 2011)

Conducting research on the adoption of ICT and staff Performance in tertiary institutions will engage more teachers in training and professional network learning (Albion, et al., 2015)

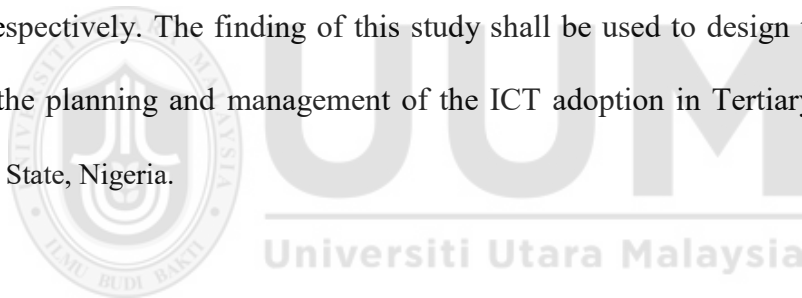
The study in the adoption of ICT in tertiary institutions will bring about improvement of ICT skills and the speedy growth of the internet, which basically will influence teacher training, (Albion, et al., 2015).

1.9 Research Scope and Limitations

This research aims to examine the ICT adoption and staff performance in Nigerian public tertiary institutions in three senatorial zones of Bauchi State. The coherent of this ICT and staff performance in public tertiary institutions was actually encouraged due to the fact that non-teaching staff in the public tertiary are not only less performing because they lacked the skills. But also lacked the effective ICT services, skills and other infrastructural facilities, which backward or slow the smooth movement of information in their various institutions, (Ogbomo, 2011; Ilaonisi & Osuagwu, 2010). Available study indicates limited research on ICT adoption and staff performance in tertiary institutions of Bauchi state. Specifically, the study of ICT in Bauchi state tertiary institutions focused on the challenges of ICT on students (Aliyu, 2011). Similarly, in the north-eastern part of Nigeria, Bauchi state institutions have limited ICT facilities (Aliyu, 2011). These established a room to conduct further study on ICT and staff performance in tertiary institutions of Bauchi State. Moreover, this study will focus on six tertiary institutions in order to have a fair representation among the selected institutions of different categories. Thus, comprised of federal and state universities; colleges of education and college for legal & Islamic studies; polytechnics and mono-technics respectively. It is important to clarify that two of the institutions are representing each of the three senatorial zones of the state. Theses

includes, Bauchi (southern zone), Misau/Ningi (central zone), and Katagum (northern zone).

Moreover, the study shall adopt mixed method to assess the six factors that influence the public servants to adopt ICT in their administrative functions in their schools, such as, perceived usefulness (PU), perceived ease of use (PEU), intention to use (ITU), attitude toward use (ATTU), social influence (SI), Actual use, and staff performance (SP). Data were generated through research instrument, such as questionnaires and open-ended interview from the sample size of the population of the staff of Bauchi State Tertiary Institutions, is comprised of the stakeholders as well as non-academic staff respectively. The finding of this study shall be used to design the strategies to guide the planning and management of the ICT adoption in Tertiary Institutions in Bauchi State, Nigeria.



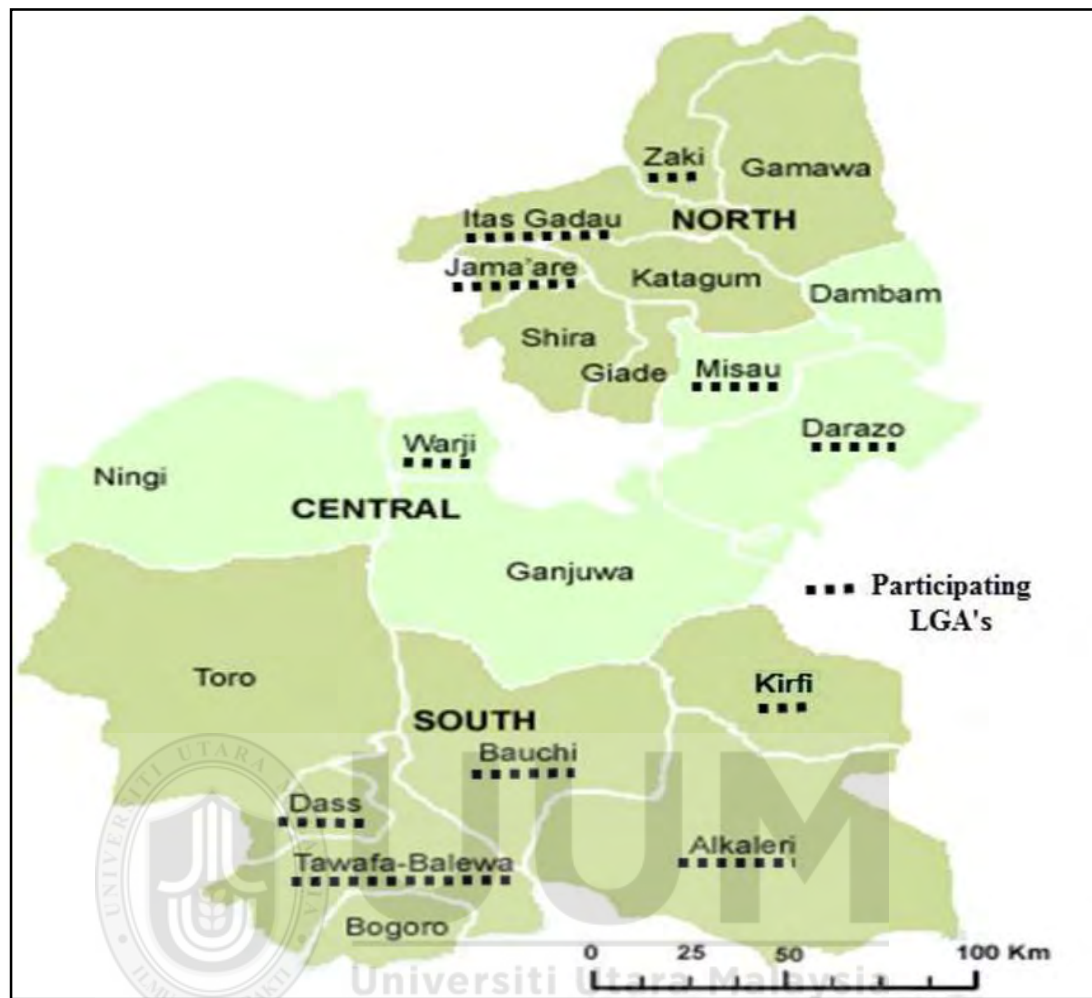


Figure 1.1

Map of Bauchi state illustrating the three senatorial zones

Sources: <https://www.researchgate.net/profile/SanusiAmin> (Amin, 2016)

1.10 Definitions of the key terms

This section defined the key terms used in the study.

1.10.1 Technology Acceptance

As adopted by Teo (2011) Technology, is the human knowledge which involves tools, materials, and systems. Technology Acceptance refers to the user's willingness to employ technology in their primary responsibilities.

1.10.2 Staff performance

The work associated activities anticipated of an employee and how perfect those responsibilities were expected to be accomplished. Some executives assess the staff performance individually on yearly, half a year or quarterly basis, this is to enable him recognize recommended areas for development (Foah 2014).

1.10.3 Tertiary Institution

Tertiary institution entails the training of highly skilled specialists in the fields of technology, economics, culture, science, etc. at a variety of tertiary education institutions, which admits candidates from the secondary school or secondary specialized education. It is the education beyond the secondary level, especially at the college or university level Encyclopedia (1979).

1.10.4 Social Influence

Social influence is the degree to which individuals perceive influences and individuals of significance reflect the entities should be as a result of fresh technology, (Venkatesh et al. 2003).

1.11 Conceptual Definitions

This section defined the meaning of the constructs as used in this study.

i. Staff performance (SP)

According to Foah (2014), Staff performance is a point to which the work associated activities anticipated of an employee and how perfect those responsibilities were expected to be accomplished. Therefore, this study describes staff performance as a degree to which, if an employee use a computer, it will increase his effectiveness and diligent performance.

ii. Perceived usefulness (PU)

Hsu & Lin, (2008), have the view that perceived usefulness refers to as the amount to which an individual perceived that using information and communication technology (ICT) enhances his or her performance. Similarly, this study explains perceive usefulness as a point to which an individual behavior perceived using ICT facilities will enable him to accomplish his tasks more quickly and increase his productivity.

iii. Perceived ease of use (PEU)

Perceived ease of use is the degree to which an individual behavior perceived that using information and communication technology (ICT) is free of effort (Hsu & Lin, 2008). More so, perceived ease of use refers to as a degree to which an individual behavior perceived that using ICT tools will make his primary responsibilities so easy and convenient.

iv. Intention to use (ITU)

According to Hsu & Lin, (2008), Intention to use is the extent to which the user would like and intends to use information and communication technology (ICT) in the future. More or less, this study described intention to use as a level to which the individual user will intends likely to use ICT tools as often as possible in the near future.

v. Attitudes toward use (ATU)

According to Hsu & Lin, (2008), attitude toward use refers to the user preferences when using the technological instrument. This study explains attitudes toward use as the mount to which an individual behavior has a favorable and desirable attitude toward using ICT tools in discharging official task.

vi. Social influence (SI)

Social influence according to venkatesh et al. (2003), is the degree to which an individuals perceive influencers and individuals of significance reflect the entities should be as a result of fresh technology. In addition, this study has the view that social influence is the degree to which an individual thought, feelings, attitudes and behavior change or influence as a result of interaction with ICT facilities.

vii. Actual use (AU)

Actual use, according to Tondeur, Van Braak, & Valcke (2007), is the frequency of using technological tools in a particular period of time. Moreover, this study view that actual use is the occurrences of a user to apply basic programs of the computer in his office task.

1.12 Organization of chapters

This study comprises of seven chapters, chapter one, composed of introduction which is the background of the study, a statement of the problem, research questions, research objectives, scope of the study, theoretical framework, hypothesis formulation, research model constructs, conceptual framework, significance of the study, limitation of the study, organization of the study and operational definitions. Chapter two constitutes a brief historical background of the study area and the brief discussion selected as a unit of analysis, although literature was reviewed in chapter three. Chapter four, consist methodology of the study. Chapter five, consist of quantitative data analysis. Chapter six, qualitative data analysis. While the final chapter seven, consists of, discussion of findings, summary, conclusion, and recommendations. The activity is illustrated below in figure 1.2.

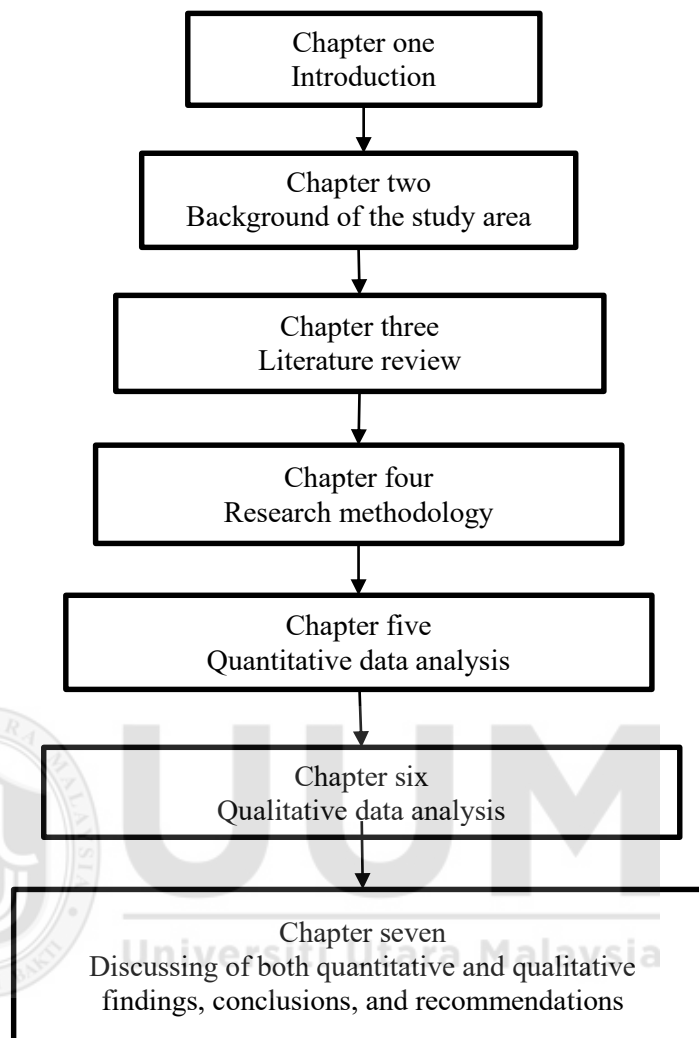


Figure 1.2
Organization of Chapters

1.13 Summary

In the above chapter, the research topic was introduced and clearly explained the problem statement. The research questions were stated to accomplish the objectives of this research. Similarly, theoretical and practical contributions, the significance of the study, and the scope of this work were highlighted, we operationalized concepts and lastly, chapters are organized. The following chapter is the background of the study.

CHAPTER TWO: BACKGROUND OF THE STUDY AREA

2.1 Introduction

The previous chapter of this study, has discussed an introduction, statement of the problem, research questions, objectives of the research, the significance of the study, the scope of the study, operational definitions of concepts, and organization of chapters. In this chapter background of Nigeria was highlighted, including the issue of brief overviews of ICT in Nigerian Institutions, ICT in Education. The chapter emphasized an overview of Nigeria, historical backgrounds of its Education system, challenges of the manual education system as well as experience information on the e-government initiatives. The chapter also proceeds to the level of the use of technology in the Nigerian education system and Tertiary Institutions and its structure.

2.2 An Overview of Nigeria

Nigeria is one of the African countries that is geographically located in the Western part of Africa. Nigeria as west African sub-region, lying between longitudes 2°40' and 14°41' east and latitudes 4°16' and 13°53' north. Nigeria shared borders with Benin in the west, Cameroon in the east, Chad in the northeast and Niger in the north. It likewise bordered by about 850 km of the Atlantic Ocean in the south. In relations to land mass, Nigeria is the fourteenth largest country in Africa with a total land area of 923,768 sq. Km. 34



Figure 2.1

Map of Nigeria within Africa

Source: Entertainment, Human Geography, Nigeria 2015

Figure 2.1 shown the location of the Nigerian geographical map within Africa. Nigeria has about 174,507,539 population size; considered the seventh most populated country in the world in July 2013 est. (CIA, 2013). It has ethical and linguistics diversity with above 250 ethnic groups and above four hundred languages and dialects, Igbo, Hausa/Fulani and Yoruba are three key ethnic groups dominated the southeast, north, and south-western part of the country respectively. The main ethnic groups have deep influence in shaping the country's socioeconomic and political backgrounds. Nigeria has multi-religious exercise with Islam constituting 50%, Christianity 40%, and to a

smaller extent, African Traditional Religion 10% as the main religious groups (,2008; Nigeria Demographic and Health Survey [NDHS], 2008 Country Profile: Nigeria; CIA, 2013).



Figure. 2.2

Map of Nigeria showing the six geopolitical zones

Source: Spatio-temporal epidemiology of highly pathogenic avian influenza (H5N1) outbreaks in Nigeria, 2006-2008. Ekong, et al. (2012)

2.3 ICT Evolution in Nigeria

The report shows that developing of information and communication (ICT) industry in Nigeria is, no doubt studied by the government, it turns into fascinating on taking after the inescapable joining of the communication technology (CT) and the majority of the information technology (IT). This might have been obvious in a late gathering sorted out toward the Nigeria computer society (NCS) the place the civil argument originated up. It will be against this scenery that I bring chaos on purpose out a percentage of the events, players, stakeholders, associations that affected in the industry positively in 2010 What's more what 2011 holds in the industry, (Omeruo, 2011)

By 2010, Nigeria transformed 50; it might have been additionally a period will survey how it has fared through 50 years' time. Nigeria computer society (NCS) under the authority of Prof. Charles Uwadia took out the long run on Audit those sway from claiming a majority of the information technology organization once national improvement. In that event, it might have been consented that despite the overwhelming tests the industry has confronted over those years, it which cuts over separate areas of the economy, has contributed hugely to national development, be it in education, medical, financial institutions, Governance, Socially as well as politically. It masters likewise said that All the more necessities to be completed. It might have been also a quite a year that saw the signing of a memorandum of understanding (MoU) between the Association of Telecommunications organizations of Nigeria (ATCON) and the majority of the information technology association of

Nigeria Nigeria (ITAN) under the authority of Engr. Titi Omo-Ettu as well as Dr. Jimson Olufuye separately. This as stated by them will assist the two forms offer the majority of the information and collaboration with respect to an amount of issues and project undertakings which may be seen Concerning illustration a great move towards those developing industries (Omeruo, 2011).

2.4 ICT in General Education

Information and communication technology (ICT) in education can be referred to as a mixture of procedures as well as the instruments includes in addressing the needs of education as well as difficulties through utilizing computer system and additional associated electronic resources as well as a skills technologist (Ball & Levy, 2008; Roblyer, 2006). Incorporation of technology in education is usually mentioned in place of educational technologies (Bernard & Abrami, 2004; Kingsley, 2007). The following are several examples of Information and communication technology (ICT) in education comprises using online learning management systems, wireless connectivity, merged technologies, internet technologies, emerging technologies for visual presentation, high speed communication infrastructures, accessing course materials through internet resources and artificial intelligent (Ball & levy, 2008).

Therefore, educational technologies are categorized into three key groups (Ball & Levy, 3008; Roblyer, 2006),

- a) Instructional Technologies
- b) Productivity Technologies

c) Administrative technologies

Moreover, almost all academics are making use of the application of information technologies today for their learning and teaching reasons such as, researching, tutorials, and simulations and extra procedures of instructions. Faculties' practice of a system of online learning is therefore quite common (Woods, Hopper, & Baker, 2004). Current use of educational technologies greater than before use of cooperative learning amongst facilities as well as scholars which encourages the approaches of constructivist in education (Bernard & Abrami, 2004). Whereas, information and communication technologies application comes up with plenty of welfares to the educational world, yet it as well own not enough challenges.

Schmidt, (2002) proposed that successfully substitutes the old-fashioned classrooms is among the maximum challenges in insertion the course taking place within the internet. Using information technologies, education practices should bring coverall teaching and learning to a greater stage quality of online learning have to be equivalent or greater than the excellence of education in the old-style classroom (Ball & Levy, 2008; Schmidt, 2002). Butler & Sellbom, (2002) out of their study recognized the major encounters to accepting technology for the purpose of teaching and learning. Butler & Sellbom, (2002) explains that undependability, unfortunate faculty with expertise in technology, confrontation to utilize new technology, the absence of established backing are the main challenges for combination and use of information technology in the environment of educational institutions.

Information and communication technology (ICT) can be able to encourage, reinforce, and assist transparent and democratic planning, and management of education. Access to learning Communications technologies can expand access to learning, improve quality and ensure inclusion. Where resources are scarce, judicious use of open-source materials through technological facilities will create an avenue to avoid the blockage of production, updating and distribution of textbooks. The need for wide-scale innovations has led UNESCO to focus principally on system-wide advancement and modification. The role that ICT can partake in modifying internal policies for education should be examined by organizations. Its role is both normative and informative, gathering facts, data and examples of ICT in education and making this information widely available. Education and learning are central to UNESCO's mandate and to most of the gains that are anticipated from the widespread information and communication technology utilization.

The greatest education requirement in the present century is to make population ready for participation in a knowledge-based economy, including the social and cultural perspectives. The cornerstone for building complete knowledgeable society is e-learning. The Unique mandate of UNESCO is to promote the free exchange of ideas and knowledge, has played a key role in global conference of knowledgeable society. Its influences unite the lawful, moral as well as socio-cultural extents of the Information Society and helped to grasp the opportunities offered by ICT by placing the individual at its centre (UNESCO, 2006).

2.5 ICT in Tertiary Institutions in Nigeria

A great higher education framework will be needed for generally flourishing of a country. A colossal development in the. The higher education sector was responsible for making the administration of the tertiary institution's complex. A large number of researches uncover that incorporation of ICT aides to decrease the unpredictability and improve the general administration of tertiary institutions. This work need to embraced to identify the numerous functional areas to which ICT will be deployed for information administration in higher training establishments and discover those current degree of use about ICT On the whole these functional areas pertaining to information administration. The Different Components that help these utilitarian regions were distinguished. A theoretical model might have been inferred furthermore approved. List Terms—General administration, majority of the information administration, majority of the (ICT), staff administration, student administration, and model.

Progress has been occurring during an uneven pace done any growth-oriented industry, and the education sector may be must be inclusive. Fast development in the field of education has constructed governance clinched alongside academic sector a very complex assignment. The 21st century has seen enormous advancements clinched alongside technology, which has prompted broad developments in the administrative system. Expense proceeds investigation, innovation joined for those adaptability done taking in furthermore regulatory exercises may be fundamental should improve efficiency. Computers can to be utilized extensively for educational

administration. Those emulating would exactly of the areas where the computers can be utilized for efficient educational administration (Ben-Zion Barta et. al. 1995):

- i. General Administration
- ii. Pay Roll and Financial accounting
- iii. Administration of Students Data
- iv. Inventory management
- v. Personnel records maintenance
- vi. Library System

Information and communication technology (ICT) assumes a basic part previously in supporting powerful, production management, as well as administration in the educational sector.

It will be specified that technology can be utilized good starting with the students' administration on different asset administration in an education institution (Christiana Maki 2008). Sharad Sinha (2008) specified the Different administrative challenges for Indian general education system of the 21st century as provided for below:

- i. Global and local Challenges
- ii. Universal and Individual challenge
- iii. Balancing between traditional and modern approach
- iv. Long term and short term consideration
- v. Competition and equity challenges
- vi. Extraordinary expansion of knowledge

Concerning illustration and only strategy, the Author said that these problems Might a chance to be overcome for those legitimate uses of Technology. In addition, large numbers studies uncovered that there were the needs for ICT integration in the administrative exercises of higher institutions of learning. Those Different ways for presenting technology in educational administrations of tertiary institutions clinched alongside with the following (Caroline Salerno 2009):

- E-mail notice Sending and notification of agendas to staff, instead of printing and distributing hard copies.
- Lesson plan submission through e-mail
- Raise technology growing by means of requesting parents to put e-mail address on medical forms and other issues
- All teachers have created a web page in their classes
- In many conferences in schools the level of Technology integration is beyond comment and the effort that principals are making in order to encourage the utilization of technology in their schools and classrooms.
- Admissions are very easy today through web services
- Technology plays an important role in daily school activities
- School general administration

Rajeev Singh (2008) has signified that information and communication technology (ICT) has assumed a major role done in lessening operational wastefulness and inefficiency and enhancing choice making for numerous areas of governance. An

incorporated higher education administration framework may be you quit offering on that one such idea that might enable those governing bodies to manage those Advance of the education plan in the entirety particular nation Furthermore serves Different stakeholders for a considerably better way. As specified by (Christiana Maki 2008), subsystems of administration incorporate workers' administration, resources Administration, students' administration, and financial organization Furthermore general administration. Frederickson and Gajek (2009) explains that general administration and communication are those two principal areas in which ICT will be utilized within the management of the management of educational institutions. It will be obvious, starting with the above that administrative activities in a higher education institution consist of personnel, students, resources, communication, and general administration, Thierer (2000) pointed out that the function of information and communication technology in teaching and learning, as well as other school activities, is quickly getting to be a very vital and widely subject of discussion in contemporary education policy. Specialist in the field of education in general accepted that Assuming that ICT may be appropriately used, it holds great guarantee with enhancing teaching and learning in furthermore will forming workforce chances. Thus, this study is set out to critically assess the role of information and communication technology in tertiary institutions of Bauchi State in improving decision making and attainment of efficiency (Adeoye, Oluwole, and Blessing, 2013)

2.6 E-Government implementation in Nigeria

The implementation of e-Government in Nigeria replicated in evolution of information and communication technology (ICT) can be studied in the graciousness of numerous strategies and policies, initiating and adopting by the government to improve ICT in many subdivisions of the economy in the direction of boosting national growth. In view of the size of the population and resources, the rate of advance of information and communication technology in Nigeria earlier than 1999 is far away below anticipations. At this point, Landline Telephone and internet usage would make a good reference, as there were below 500,000 fixed telephone lines and less than 300,000 consistent internet users.

The binding problem led to a forceful revolution in numerous information and communication technology related commission services, policies and Acts of Nigeria. Thus, The National Telecommunication policy was implemented in the year 2000 to encourage development of information and communication technology (ICT) industry and later, Nigerian Communication Acts were legislated in the year 2003 to ensure lawful back up to the National Telecommunication Policy. Likewise, in 2000 National Information technology was approved in order to guide information technology industry in the country.

More so, the policy was to go along with the enactment of Act 2007 of National Information Technology Development Agency (NITDA) that placed the lawful stand for the setting up of National Information Technology Development Agency (National

ICT Policy, 2012). The Information Technology Development Agency was recognized together with others appliance ICT associated policies and after establishing some challenging in-house structure for the facilitating of implementing capabilities. Some projects like, Public service network, capacity building and mobile Internet unit were fixed (Sabo, 2015). Following to the regulatory improvement and policies along other privates and governmental creativities the amount at which ICT sector is progressing have extremely improved. Yet again, important transformation in numerous Information and communication technology (ICT) growth in Nigeria by means of some motivating indicators.

To reinforce the perspectives that information and communication technology (ICT) in Nigeria has been transforming extremely (National ICT Policy, 2012) can be observed by contrasting variations in the UN's benchmarking indicators (2003, 2004, 2008, & 2012) as presented in table 2.3.

Table 2.3

ICT benchmarking indicators in Nigeria

SN	Measurement	Years			
		2003	2004	2008	2012
1.	Mobile/Cellular subscription, per 1000 persons	13.6	13,4	24.05	55.10 (per 100 people)
2.	Technological infrastructure index	.013	-	.049	.127
3.	PCs per 1000 persons	6.8	7.1	.91 (per 100 people)	28.43 (per 100 people)
4.	Internet (per 1000 users)	1.67	3.5	5.95 (per 100 users)	-
5.	Internet index	.003	.0	.067	-
6.	Persons online index/online service index value	.001	-	-	22
7.	Fixed internet subscription (per 100 people)	-	-	-	0.12
8.	Telephone line (per 1000 people)	5.8	5.8	1.26 (per 100 users)	1.26 (per 100 users)
9.	Telephone line index	.006	.0	.013	-
10.	Fixed broadband subscription (per 100 people)	-	-	-	0.06

In table 2.3 above is a combined of e-government survey of 2003, 2004, 2008 and 2012 of the United Nation that displayed at a glance, the stepping amount at which e-government succeeded in Nigeria. Take for example, the mobile's subscriptions have increased from 1.36 in 2003 to 55.10 in 2012 per 100 people. Similarly, the amount at which a person has enough money to have a personal computer like laptop have greatly increased from 6.8 per 1000, i.e. 0.68 per 100 people, in 2003 to 28.43.43 per 100 people in 2012. Equally, internet user's column increases significantly from 1.666 per 1000 people, i.e. 0.0166 per 100 people in 2003 to 5.95 per 100 users in the year 2008.

2.7 E-Government Implementation level in Nigeria

According to Agunloye (2006) as cited in Sanusi (2012) in developed and developing world's electronic government (e-government) is striving towards providing cheaper and accessible service presented by the government to its business associates and citizens. Generally speaking, e-government can be demonstrated into three major categories. Thus,

- a) Government-to- Government
- b) Government-to-Citizens
- c) Government-to-Business

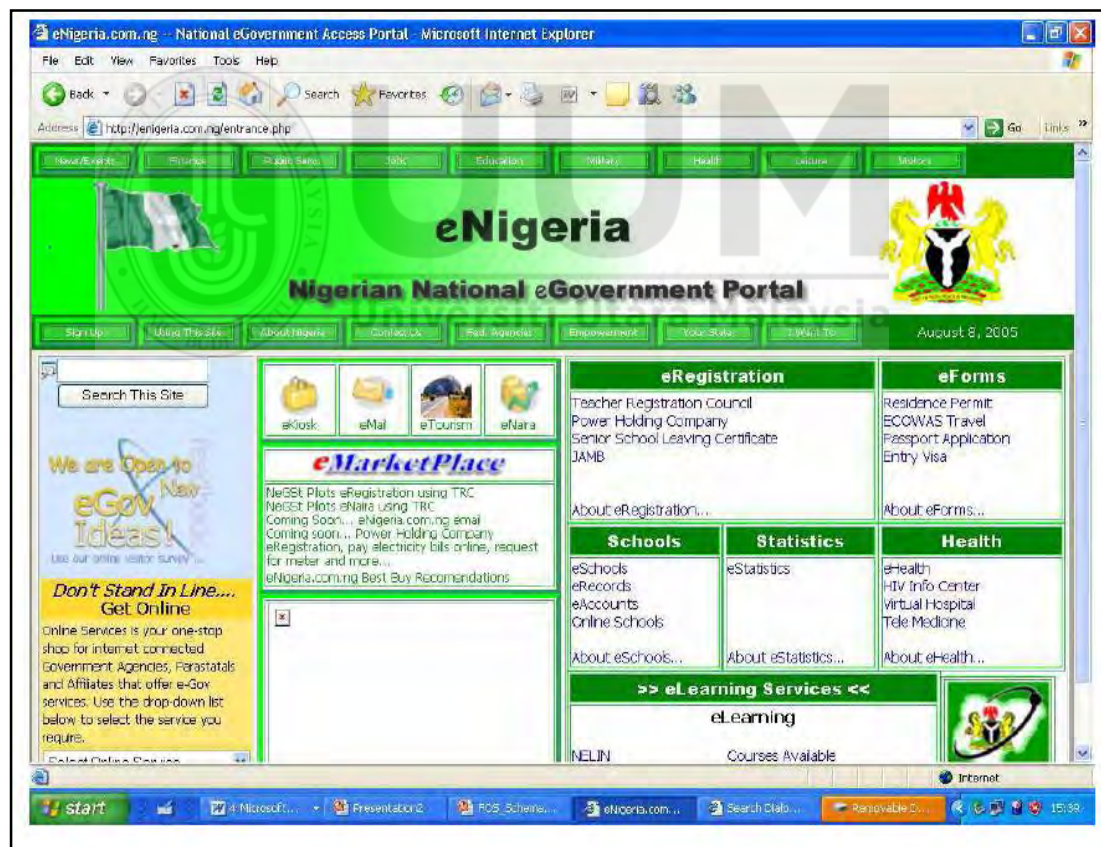


Figure 2.3
Nigeria's e-Government Access Portal photo.
Sources: Nigeria's e-Government portal, Sanusi (2012).

2.8 Summary

This chapter within the background of this studies discussed public service structures, an overview of Nigeria, Information and communication technology (ICT) evolution in Nigeria, ICT in general education, ICT in tertiary institutions in Nigeria, as well as looked at the e-government implementations in Nigeria. The next chapter reviews the literature from preceding research studies.



CHAPTER THREE: LITERATURE REVIEW

3.1 Introduction

This chapter is comprised of reviewing literature on the related studies associated with technology acceptance, particularly in educational settings, and to lay the theoretical basis for the present study. Also reviewed foundation theory and major concepts of the study such as intention to use (behavior intention to adopt), perceived usefulness, perceived ease of use, attitude toward usage, social influence and staff performance as well as summary of the chapter were presented in this section. Literature review aids the scholar comprehend current research and where new research is required, offer a concrete theoretical basis, justify the input of the study, and validate and structure the research approach (Levy & Ellis, 2006).

3.2 ICT Adoption

The TAM Models concentration on the factors which influence the adoption and acceptance of technology. Taking a leap from the technology acceptance models (TAM) (Davis, 1989) closely, it's copied UTAUT (Morris, Venkatesh, Davis, & Davis, 2003). Then the TPB (Ajzen, 1991) discloses certain main features. Entirely these three models distribute a slightly outstanding resemblance in their underscoring method of which together concentration on the individual perception as well as their result of executing an action, as a result the adoption and acceptance of ICT awareness for the aim of this research can be as the comprehending or views close a specific feature or thing (Davis, 1989). Within the TAM, Davis (1989) practices, perceptions

of persons as an adoption predictor. The investigator precisely pronounces perceived usefulness and perceived ease of use in the study. Model UTAUT Venkatesh, Morris, Davis, and Davis, (2003), outlines four major bottoms of a person's acceptance as well as practice behavior: effects expectancy, performance expectancy, social influence as well as aiding circumstances, as a result additional lay emphasis on the persons' perception in adoption of ICT.

3.3 Technology Acceptance Model

Wide empirical study was set to administer exploring factors related to model that deals with individual behavior to admit the use of technology TAM within an extensive diversity of locations (Agarwal & Prasad, 1998; Dillon & Morris, 1996; Taylor & Todd, 1995). Due to that, numerous hypothetical representation was established towards describing two of person's psychological plan in utilizing technological facilities as well as real individual psychological utilizations of technological facilities (Venkatesh et al. (2003). This can be deduced that perceived usefulness, perceived ease of use, attitude toward use and social influence can create intention to use and positive expectation from the intention to use would lead actual usage of the ICT among staff of the tertiary institutions. Davis (1986) anticipated TAM as the standard representation of information system in thinking of an individual in utilization of technology and factors related to the adoption of computer services. Similarly, TAM was established and recommended the model Theory of Action Reasoning, which advises and given assured that intention can predict at the highest level of individual behavior (Davis, 1986; Venkatesh, & Davis, 2000). Therefore,

positive individual behavior would no doubt influence staff performance. The behavior technology adoption Model spreads reasoning action model as well as recommends possibility to the very determinant of a person's intention to use a system are both the perceived usefulness as well as the perceived ease of use.

Among other scholars, Legris et al. (2003) has been clearly indicated that there is a reliability in many studies findings, outcomes of both TAM and TRA because they are very good in intention prediction. Widespread studies evaluate exploring variables usually use for adoption of ICT recognized within information system research, Legris et al. (2003) advised for the models of technology to unite and modify in order to be wider that can recognizes extra predicting factors that can affect the adoption of ICT. Nevertheless, an advised has been given that if at all a model will have combined features of both the two theories provably will give the most comprehensive opinion of foundation of adoption of technology (Davis et al., 1989).

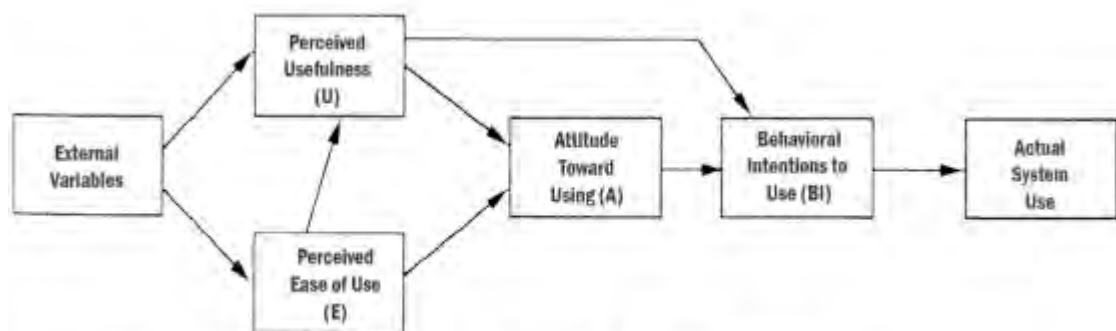


Figure 2: Technology Acceptance Model (Davis et al. 1989, p. 185)

3.4 Theory of Reasoning Action (TRA)

The theory of reasoning action model which was proposed by Fishbone and Ajzen (1975) well recognised to describe and predicts human behaviour in numerous fields. The theory invented from the discipline, social Psychology to serve as an intention related model. At the top of this theory, is the person's assumption that are, too frequently than not, normal existences who utilized the existing information, seeing the consequences of the action they made in advance determining whether to take part or not in a particular behavior in (Fishbein & Ajzen, 1975).

Theory of reasoning action (TRA) as a theory of technology adoption expected that the individual's behavioural intention to carry out or not assured objective behaviour is directly and exclusively answerable for influencing that person's aim behaviour. In another way, an intention of the individual is supposed to be cooperatively decide by the two influences: subjective norms and attitudes towards the behavior (Fishbein & Ajzen, 1975). The descriptive of attitude towards behaviour as person's biased attention of how desirable or undesirable he feels as soon as carrying out the aim behaviour, while biased norms are able to be watched as an individual's observation of the social stress taking place with him to do the aim behaviour (Fishbein & Ajzen, 1975).

Further associated with this is that valued model of expectancy, of approach suggested that person's attitudes on the way to execution the aim behavior is this one strong-minded by his belief concerning the penalties of execution the aim behavior, and the

assessment of these penalties. On the other way round, subjective norm of an individual is the by-product of his motivation to comply and normative beliefs and motivation to comply (Fishbein & Ajzen, 1975).

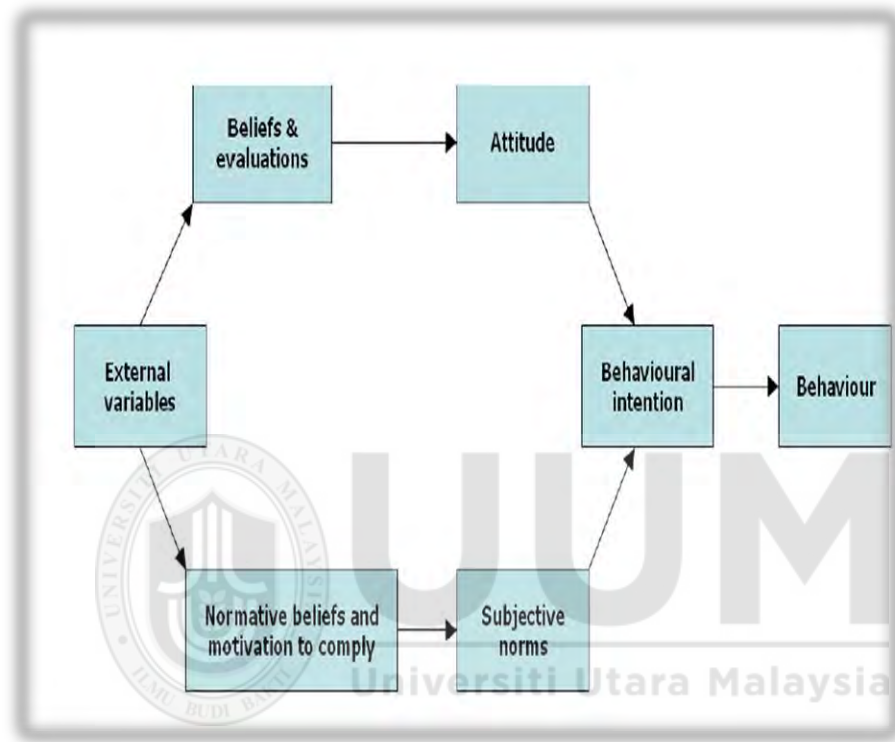


Figure 3.1
Theory of Reasoning Action
 Source: Theory of Reasoning Action (Fishbein & Ajzen, 1975)

Moreover, there are understanding views about the major shortcomings of TRA that a number of studies have been carried out. Davis (1986) it is for the reason that TRA has less prediction power we introduced TAM which has greater predictive and authentication power as soon as using new technologies. The following are some of the limitations of TRA: The TRA say no to insist on the beliefs that are functioning for specific behavior (Davis, 1989).

The theory gives more emphasis to prediction instead of outcome which several scholars found to be appropriate. Etc.

3.5 Theory of Scientific Management

Systematic process and scientific tool were assumed by Fredrick Taylor in (1911) as some of the basic impetus staff performance. He further lamented that scientific management needs first, a watchful examination of each of various changes of the similar tools, established under rule of thumb; and second, after time and motion study has been completed through the speed achievable out of each of these instruments, that the better opinions of many of them will be unified in it is own standard execution, which will ensure the employee to perform duty very fast and with simpler than he could perform earlier.

The device, is the assumed as normal in habitation to the various unlike types earlier being utilizing as well as maintain the normal remains standard for general staff to keep on utilizing pending outdated by an instrument through study of motion and time, to remain better." New responsibilities of management were expanded to comprise: old rule of thumb replacement with scientific management choice and train scientifically, impart and improve the staff "Energetically unite with the employees for them to assure responsibilities being executed in line with science ideologies that has been established" work should be take over for which they are "sweat able to" than the staff. For that reason, Taylor again summarized the ideologies of Scientific

Management as better suited staff performance (Fredrick Taylor, 1911). Therefore, ICT is a systemic and scientific implement that standardized work process with easiness in usage. The intention to use and actual use of ICT as motivated by it scientific process which is the initial position of scientific management theory in boasting employee or staff performance. Hence, the integration of TAM, TRA and scientific management theories has strength of explaining conceptual of this study, because TAM postulates that perceived usefulness, perceived ease of use and attitude towards use are related to ICT usage. While, TRA postulates that social influence is related to ICT usage. In this quest, scientific management theory postulations rely on the adoption of scientific tool such as ICT. However, ICT is a means to staff improvement as its usage is an end to staff performance, therefore, the integration of these adapted theories would help in explaining the model of this study as highlighted above (Fredrick Taylor, 1911).

3.5 Staff performance (SP)

According to Foah (2014), Staff performance is a point to which the work associated activities anticipated of an employee and how perfect those responsibilities were expected to be accomplished. Therefore, this study describes staff performance as a degree to which if an employee uses a computer it will increase his effectiveness and diligent performance.

Employee performance is the kind of input that an employee gives to his /her organisation for the purpose of supporting productivity. Performance is a robust

prediction of employees' advancement in his/her career (Carmell, Shalorn, & Weisberg, 2007). In another view, employee performance is necessary if he/she is to increase the level of his/her career in a particular organisation among other factors, this will henceforth bring about efficiency in general (Chong, 2013). These scholar's argument were built in regard to the signalling theory that guesses the degree of involvement of employee effect the promotional conclusion of organisation to employee that leads to his upgrade in his career and as well increase the level of attainment of the organisation overall objective. Signalling theory proposes that an employee past record of great performance signal an organisation concerning his/her effectiveness in performance currently and expected efficiency to perform in the future in his/her career (Harris, Pattie, & McMahan, 2015). This further determine that employee job within organisation send a sign to the organisation concerning the employee's record of performance which makes an employee to be pronounced as an able of performing his/her expected job with full confidence. Therefore, greater performance displays that an employee has the human capacity requires to be performed in his career and the overall organisational goal. Henceforth, an employee should have additional value to progress within his career in service (Harris et al. 2015).

Performance of an employee in an organisation has significant role to play on the individual's promotion opportunity which will later lead to adjustment of status such as salary increment, notional promotion etc. (Nkereuwen, 1996), as well his performance increases the productivity. Likewise, this scholar further explains that

employee performance is ascribed to the individual ability. Yet, in the same research study, ability attribution of individual performance relates to the upgrading of status among women library in Nigeria. More so, previous performance in teaching and supervision among others were related positively, Thai nurses to convert to nurse tutor was explained by self-efficacy and findings via social cognitive career theory (Thungjaroenkul, Cummings, & Tate, 2016). Performance is therefore opened to ensure status upgrade since individual capability to perform and facilitates objective accomplishment. Individual great level of performance buttress salary increment and promotion which are pointer of advancement in working career (Kirchmeyer, 2005). For example, in a tertiary institution as a lecturer the greater performance of an academic staff in term of paper publications in reliable journals and conferences participation effect the opportunities of status upgrade. Likewise, both genders (men and women) were found to relate performance in public universities in Uganda central as an element for advancement (Beinomugisha, Kanya, & Said, 2014), thus the greater the motivation, the greater the productivity.

Chong (2013), has the view that, performance of an employee serves as an effective element to increase his status regardless of the environment or ethnic background of the individual employee. Great performance was found to goes beyond direct effect to individual advancement in career, but it has also unfavourably effect even the advancement of subordinates through the influence of supervisor great performance. Moreover, other scholars, Malhotra and Singh (2016), maintained the same assertion that positive relation existed between Job capabilities as an element of performance

derives efficiency in both British and Singapore. Chong (2013), also defines the managerial competencies as the features that are correlated to effective job performance, which is measured in terms of an employee input to the organisation.

Correspondingly, it has been observed that job performance as assisted by leadership and information technology skills importantly effected potentials of graduates' advancement in job career (Heimler, Rosenberg, & Morote, 2012). Henceforth, signalling theory postulated that employee performance effects individual value to the organisation and build relevance of a person and pay back interns of promotion and total improvement in job career, which will eventually improve organisational efficiency (Chong, 2013).

3.6 Perceived Usefulness (PU)

Perceived usefulness is one of the key variables for technology utilization behavior as far as ICT adoption is concerned. Theory of computer adoption has worldwide used to examine the behavior of individual on technology adoption in all sorts of technological facilities, (Davis, 1989). According to Surendran (2012), based on Technology acceptance model, the factor of both PU and PEU are the main computer use behavior factor. In many forms of information systems, TAM has been broadly utilized to examine single technology acceptance behavior. Davis, (1989), makes an innovation of a theory that influence individual behavior in adoption of technology related known as TAM model. The model suggests two key factors to serve as major concepts, touching individual behavior in adopting technology; these are factors for

expecting use of technology is important and the factor of weightings the ease or difficulty in adopting the technology; another factor is also expecting the adoption of technology is enjoyment considered also as a supplement of factor that very essential in touching individual behaviour on technology in cooperation (Davis, Bagozzi, & Warshaw, 1992).

Perceived Usefulness is said to be as subjective provability use that utilizing a precise Utilization of technological instruments could lead to a greater height in performing a task in some particular administrative settings (Davis et al., 1989). Perceived Usefulness entails an amount in which an individual having faith in by means of a system will develop her presentation (Davis 1989). PU has been revealed to inspiration behavioural target whole behaviour (Davis 1989; Taylor and Todd 1995). Substances process of evaluating perceived usefulness if at all existing, described inner stability belongs to outcome factors. Davis, (1989), suggested more than five things dimension instrument. These things comprise four most utilized dimensions, usually accepted: (a.) make use of technology enhancing my efficiency; (b.) A system adoption, utilization, ensures more efforts in my job performance; (c.) My job performance becomes more effective by using the application; and (d) Generally, I believe system use valuable in performing a task. Whole perceived usefulness's dimension establishes the general suitability level of steadiness (Legris, John, & Pierre, 2001)

Previous studies conducted research on perceived usefulness (Law, Grundy, Vasa, & Cain, 2016; Pumawirawa, Pelsmarkesr, & Dens, 2012; Antonio, Ana, & Aurora,

2013). Furthermore, Antonio, Ana, & Aurora, (2013), conducted a study on perceived usefulness, gender differences in Spain, using quantitative research design and discovered that there were no significance differences found in two major constructs of TAM depending on what gender. Therefore, recommended self-efficacy or social norms, more especially in the females' cases where the power of the explanatory was lower. Antonia, Ana & Aurora, (2013), conducted a study on perceived usefulness and gender difference in Spain is using quantitative research design and analysis the data through regressing analysis, findings. The study recommended that, the data uses from other institutions, countries or regions would contribute more to results generalization.

Yet, another study, Pumawirawa, Pelsmarkesr, & Dens, (2012), conducted a study on Equilibrium and categorization within an internet in online evaluations, in which way constructs of usefulness influence approaches as well as intention within Belgium, using quantitative method of data collection. The study discovered that perceived usefulness thus, his findings established PU of the review of internet established involved by the situation equilibrium as well as categorization. Progressive or undesirable (unbalance) evaluation groups have measured extra valuable ahead of the neutral (stable). Consequently, recommended that further researcher could examine to what degree evaluations of changing Significance work together with a sense of balance and sequence sound effects. So also more study could prolong these results by changeable the foundation of information. In view of the above, this study sets of hypotheses to find the relationship between PU and PSE within tertiary institutions, Bauchi state, Nigeria.

3.7 Perceived ease of use (PEOU)

This construct also is said to be among the key construct in technology adoption behavior. TAM partakes spread utilization for examining a person's behavior, (Davis, 1989). According to Surendran, (2012), based on Technology acceptance model, the PEOU factor is the key factor within technology adoption behavior. In many forms of information systems, has been broadly utilized to examine single technology acceptance behavior (Davis, 1989). He suggests PU as well as PEU known as major concepts, touching individual adoption; also the factor that expects to use technology is an enjoyment is the additional far ahead considered a key construct of technology adoption behavior (Davis, Bagozzi, & Warshaw, 1992).

PEU refers to as the degree that of the finished goods is so simple to know as well as practice (Davis, 1989). Davis, Bagozzi, and Warshaw (1989) establish PEU improves worker adoption (a.) Not directly touching acceptance aim channel perceived usefulness and (b) by the straight manipulating acceptance target. In recent times, van der Heijden (2004) informed about the linking efforts of the two variables of useful use and easy using straight as well as unplanned effect channel PU on a communicator's aim in utilizing hedonic info schemes like amusement Net spots. Nevertheless, in real point technologies are allowed of psychological and physical struggle.

It essentially not raises the important they provided. Beginners, intended for instance, discovered must hard utilized arithmetical bundles, instead, considered the software

bundles valuable instruments used for stylish arithmetic scrutiny. For more detail, latest literature hardly includes link amid of PEU as well as PU theorized (Hsu, Lu, & Hsu, 2007). Based on the aims, the user's nonstop aim of utilizing SMS will increase by simply theorizing the perceived ease of use (PEU).

PEU refers to as the amount that individual behaviors perceived the technology facility will be so simple to use. Technology instrument seems per half it will be supportive when it comes to execution vital jobs as well as simple, naturally estimated most seriously and regularly believed required. A brilliant theoretical analysis of the model had been delivered if it extended (Venkatesh and Davis, 2000), the student is stimulated in utilizing the said basis aimed at an extra considered literature review. PEOU refers to as amount that user's perception for the technology utilization will be no effort (Davis 1989). Practical to connected customer act, PEU receiving information is precise explaining as an amount that customer trusts that receiving produce information from a website would be free of struggle. Likewise, perceived ease of buying is well-explains that is the volume in which an individual trusts that buying products from a Web seller would be allowed of struggle. Like to PU, the part of PEOU on aims is intervened by approach (Davis 1989; Taylor and Todd 1995).

In accumulation to the attitudinal part of PEOU, the contributory feature of PEOU (Davis 1989) is observed as a regulator belief that enables a behavior with minor individual struggle (Lepper 1985). For example, Davis disputed that SE is one of the resources by which PEOU effects behavior. Applied to e-commerce, a website from

which it is - perceived as presence easy to get material and mark a buying is possible to raise the buyer's skill and self-assurance in getting the instruments for assessing PEU. We notice that four things are additional regularly used: '(1) Learning to operate (technology) is easy for me; (2) I find it easiest to get (technology) to do what I want to do; (3) the application is very inelastic to be cooperative; as well as (4) Technology is found easiest to use. These are established to lead to a sound degree of inner reliability in 12 articles or more. Davis (1989) provided unlimited attention to constructing a concrete instrument to quantify PEOU. His 1989 study recommends a six things measurement tool, which comprises the four most usually used items. (Legrisa, John, and Pierre, 2001)

Therefore, numerous literatures conducted research on perceived ease of use, is one of the constructs of this study and came up with results, using different methodologies, and suggested some recommendations, such as (McLean, 2016; Hess, McNab, & Basoglu, 2014; Abdullahi, Yogesh, Rana, & Williams, 2016; Abdullahi, Ward, & Ahmed, 2016). Moreover, Abdullahi, Ward, & Ahmed, (2016), conducted a study on two variables of TAM on electronic selections, in the United Kingdom; using quantitative research design approach and discovered that, Experience is most higher forecast of students' PEU, then followed by the rest of Enjoyment, then Self-efficacy as well as Subjective Norms. Therefore, this shows that both ease of use and usefulness predict behavior intention of the students to use e-portfolios. He, therefore, recommended that, his research only explored the title role five mentioned exterior variables in influencing the two main determining factors Perceived Usefulness and

Perceived Ease of Use. He explains that there more factors apart from these four mentioned in this work that affects these two contributing factors stated in the general extended technology acceptance model for e-learning (GETAMEL). Prospect researchers should experiment the likely insertion of extra exterior variables that are yet to be explored in research.

Yet again, he explained that he engaged his with cross-sectional and determine intention to use and perceptions at a particular period of time. It should be noted that perception of students about perceived ease of use and perceived usefulness of e-portfolios can be changed from time to time as they are achieving more experience. He suggested that longitudinal survey should be carried out by the future researcher to assess the validity of the GETAME and they are finding, attractive interested in explaining the variations in perception of users and behavior for a particular period of time.

So also, Abdullahi, Yogesh, Rana, and Williams, (2016), conducted another research on consumer adoption of mobile banking, examining the role of usefulness, ease of use, perceived risk and self-efficacy in Jordan, using quantitative method of research design and discovered that his results disclosed that behavioral intention has significant influence by perceived usefulness, perceived ease of use, and perceived risk. They accordingly, recommended that in their study Mobile Banking has reflected negatively on the results' generalizability of another type of online banking. So, they have suggested that future research should consider other channels that were ignored

such as Telebanking, internet banking. So also future research is to measure other factors that were ignored, such as motivation, intrinsic, financial limitations habit and trust. Yet again, future research is to dully employ comparative studies to consider technological culture, human differences between advanced and developing nations. In view of the above, this study is set of hypotheses to find the relationship between perceived ease of use and efficiency and indirect relationship through the mediating variable intention to use, in tertiary institutions in Bauchi state, Nigeria.

3.8 Intention to Use (ITU)

Intention of individuals to carry out a particular behavior is hinged to both Theories of Planned Behavior and Theory of Reasoning Action. So intention involves aspects of motivation that have emotional impact of the behavior. It is also worth the lengthens to which an individual is prepared to attempt as well as the money of the struggles they are scheduled to apply so as to display place in behavior Ajzen (1991). Moreover, Ajzen (1988) proposed the theory of planned behavior as an extension of Theory of reasoned action (TRA) which developed as an extension to the previous explanation of behavior

Yet again, Ajzen (1991); Campbell (1963) have the view that human behavior is greatly predicted by the dispositions of behavior thus, social attitudes and personality traits. Likely, as long as the individual has a control, performance influence by the intention, whereas performance rises with individuals' behavior control equally motivated to an amount of making try. Jajzen (1991) worried that as an over-all rule,

the sturdier the intention to take part in a behavior the more to be expected should be its performance.

Accordingly, Ouellette & Wood (1998) clarified that the intention is able to deliberately predict behavior by a device of regulator intellectual methods and that intentions are designed from soundless beliefs concerning the results of an act. Consequently, intention is a mirror image of attitudes in the direction of the behavior of execution an act whose penalties is perceived as encouraging. So as result, attitudes are connected to behavior over and done with their influence on behavior intentions. It was advised that person's behavior intention affects his or her behavior when the behavior interrogation is in volitional regulator.

However volitional regulates or control act of certain behaviors to a level of amount is depending upon the factor of non-motivational such as obtainability of necessary opportunity, resources together with money, skills, time, etc. In respect of this, it has been explained by Ouellette and Wood (1998) that motivational factors, opportunity and peoples' ability decide cognizant intentions to carry out a duty. In further expression, depending on the opportunity, ability and motivation level people intentionally take part in kinds of reasoning. Intention establishing needs gathering to methods liable on the nature of the behaviors and in what manner, difficult or easy to expect an environmental change. It is only least efforts and shallow thought is needed for the intention to be rescued from experiential signal or memory (Ouellette & Wood, 1991). Nonetheless, bring into being the intention might include thoughtful, wide, and

systematic analysis (Eagly & chaiken, 1993). Behavioral intention to use is a great determining factor of actual use and forecaster for forthcoming use (Mathieson, 1991; Feng, 2012). The Person's decision of whether or not to adopt a system is depending on behavioral intention in the future, a significant decision instrument to system developers, policy makers, Merchandisers, technology enterprise, and consumers (Jackson, Leitch, & Chow, 1997).

In view of the above, this study tends to hypotheses that intends to use mediates the relationship between perceived usefulness, perceived ease of use, attitude towards use, and social influence and public service efficiency.

3.9 Attitude Toward use (ATU)

Attitude toward use is all about respondent's assessment of whether is interested to adopt certain technology facilities. Individual plans can be considered as the most determinant of adopting the technology (Davis, 1989). In the theory of reasoning action (TRA), behavior is suggested to be strong-minded by a person's aim to achieve the conduct and 'intention' is a task of that individual's approach in the direction of the manners and his or her 'personal norm' (Ajzen & Fishbein, 1980). Although 'attitude toward behavior' mentions to the extent of desire a person develops from carrying out a conduct, a personal custom is well-defined as the degree to which a single is inspired to obey with the opinions others grasp about that conduct. The theory of plan behavior (TPB) is a scope of the theory of reasoning action (TRA), which

comprises perceived behavioral control. It is well-defined as the aspects that affect an individual's view of how easy or hard it would be to execute a behavior (Ajzen, 1991).

Davis (1989) proposed the TAM, with a prompt wish to clarify an operator's extent of technology acceptance. In the TAM, real technology use is resolute by one's behavioral aim to use a specific technology. Individual aim effected with individual approach in the direction of utilizing, and by the straight as well as non- direct influence of PU and PEU. Together PU and PEU jointly influence ATTU, while PEU has effected PU directly (Davis, 1989). Regardless of studying an above and five other copies of adoption of technological facilities Venkatesh et al. (2003) planned the UTAUT to clarify workers' aims to "use technology and subsequent usage behavior, this theory depends on four main ideas (performance expectations, effort expectancy, social influence, and facilitating conditions) to forecast together practice intention and behavior. Seeing the proof drained from empirical educations that engaged the above theories and models, Teo (2010) established a model showing TA as a multi-dimensional construct consisting of five issues: perceived usefulness; perceived ease of use; attitude towards technology use; personal custom; and simplifying state of affairs.

Nevertheless, several literatures conducted research on Attitudes towards use, one of the constructs of this study and came up with findings and results, using different methodologies, at various locations and suggested certain recommendations, such as (Teo, Milutinovic, & Zhou, 2016; Chia, 2016; Triberti, Villani, & Riva, 2016; Walker,

2015). Moreover, Teo, Milutinovic, & Zhou, (2016), conducted a study on “Modelling Serbian, pre-service teachers’ attitudes towards computer use: A SEM and MIMIC approach” in the United Kingdom; using quantitative research design approach and discovered that, In their finding results on attitudes towards computer use, only perceived ease of use, perceived usefulness, and technological complexity were found to be significant predictors. Despite the fact that facilitating conditions and subjective norms were not. Yet, the results shown by using MIMIC modelling indicated that gender and age as well as the course of study on pre-service teachers’ attitudes towards computer use had no significant influence.

More so, Triberti, Villani, & Riva, (2016), conducted another study on “Unconscious goal pursuit primes attitudes towards technology use: A virtual reality experiment” in Italy, using quantitative method of research design and discovered that his results disclosed that they did follow-up t-tests to evaluate dissimilarities stuck between City and House surrounded by any of the two icon circumstances (map, book) Single P. U. interfaces of mobile phone containing the said telephone book icon significantly diverse through circumstances. Accordingly, they recommended by generalizing that future research should know that interactive technologies be worthy compound evaluation approaches, exposed to the variable associated with emotion, context, goals/motivation and individual differences. Future challenges demand conducting research in technology uses in everyday context, be able to capture the density in its natural manifestation, to ensure that it improves our capability to design technologies praiseworthy of adoption. In view of the above, this study is sets of hypotheses to find

the relationship between Attitudes towards use and efficiency and indirect relationship through the mediating variable intention to use, in tertiary institutions in Bauchi state, Nigeria.

3.10 Social Influence (SI)

Social influence as described by Venkatesh et al. (2003) is the measure to which persons perceive influences and individuals of significance consider the entities should be by means of fresh technology. Venkatesh et al (2003). Measured social influence with a four element degree built on the acceptance of six models. The six models comprised (a) the theory of reasoned action, (b) the TAM-two, (c) the theory of planned behavior, (d) the consumer technology acceptance model, (e) the ideal of individual computer utilization, and (f) innovation diffusion theory. In this study, the dimension of social influence was measured with the complete subscale centered on the theory of reasoning action (TRA) study (Fishbone and Ajzen, 1975). An example of the new question was "People who influence my behavior think that I should use the system" (Venkatesh et al., 2003).

Social influence entails the amount to which an individual believes persons who are significant to him or her, needs her/him to do a certain behavior (Lee, 2010; Liao, Chen, & Yen, 2007; Venkatesh et al., 2003). Planned behavior theory (TPB), based on the theory of rational action (TRA), talks about to this factor as a personal norm and offers theoretical grounds for its association with individual Conduct (Ajzen, 1985; Ajzen, 1991; Ajzen & Fishbein 1973; Ajzen & Fishbein 1980). This factor is

likewise looking like in a number of models of user acceptance of ICT (Hsu & Lu, 2004; Taylor & Todd, 1995), and empirically it has acknowledged strong backing as a driver of user behavior (Kim, Kim, & Shin, 2009; Lee, 2010; Schepers & Wetzels, 2007). The theoretical thinking underlying this connection rests on a person's motivation to obey with others' beliefs to make stronger his or her associations with group members (Goodwin, 1987). We have no purpose to trust that these outcomes would be different in an e-learning setting (Hung & Chang, 2005; Lai & Chen, 2010; Luarn & Li, 2005); rather, we anticipate social influence to show the significant part in attracting behavior in the direction to use technology communicating instruments. SI enable detached keen on informational and normative effects (Karahanna, Straub, & Chervany, 1999). Within an environment dominated by technology the effects of informational brings about student's awareness that the information gotten from others all over the place the ICT has improved individual's awareness. Normative influence as an alternative mirrors in-house user's engagement to practice the technology in a method likely with different associating. Giving by Liao et al. (2007), maximum authors usually concentrated only in the normative section of the SI, which perhaps give details as an insignificant correlation in the middle of this variable and Individual aims in volunteer settings (e.g., Chau & Hu, 2002; Lau, Yen, & Chau, 2001; Lewis, Agarwal, & Sambamurthy, 2003; Roberts & Henderson, 2000).

This research thinks through the significance of the informational influence in e-learning and make available a rigorous basis for understanding its serious part in individuals' behavioral attitude and intentions. Precisely, we hypothesize social

influence as the amount to which a handler perceives that others accepted and stimulated their participating (Hsu & Lin, 2008). This work proposed, that users may employ an ICT because their colleagues and friends are using it, discourse about their helpful experiences with it, and clearly encourage its use (Lee, 2010). Similarly, when an individual discovers that people around him/her use an ICT tool in an e-learning setting and perceive the profits of its employment, that an individual will be extra willing to use it.

Nonetheless, many literatures conducted research on Social Influence and came up with results, using different methodologies, and suggested some recommendations, such as (Risselada, Verhoef, & Bijmolt, 2014; Workman, 2014; Olschewski, Renken, Bullinger, & Mostein, 2013). Moreover, Risselada, Verhoef, & Bijmolt, (2014), conducted a study on Dynamic Effects of Social Influence and direct marketing on the Adoption of Higher Technology Products in USA; using quantitative research design approach and discovered that, they had found that from the cumulative adoption social influences decreases from the introduction of product onward, while the result of current adoption is unchanged. Yet, only straight marketing and overlooked mass-marketing data, since they did not get access to this data. They as well indicated that further research might use data of social media, like twitter and Facebook to comprise a practical analysis of the discussions consumer in a network.

So also, Workman, (2014), conducted another study titled Current media and the modifying face associated with information and technology organization use; the

significance of task pursuit, social influence and experience in the USA, using quantitative method of research design and discovered that his results disclosed that they witnessed that among independent variables there were certain statistical significant correlations rising a number of concerns of multicollinearity. He solves the problem on dual stages. From the beginning, they detached items commencing the weighing machine pending multicollinearity patience were satisfactory, which remains directly above seventy. 70, based on Alison (1999) and Mertler and Vennatta (2002). Secondly, he focused the data in the deviance score form rendering to Aiken and West (1996) and Allison's (1999) recommendations for conducting the hypothesis tests, indicted in the regression formula.

He accordingly, recommended that his findings will request for a non-stop exploration of the technology usage interrogation. In line with the above, this study set of hypotheses to find the relationship between Social Influence and efficiency in tertiary institutions of Bauchi state, Nigeria.

3.11 Actual use (AU)

Actual use, according to Tondeur, Van Braak, & Valcke (2007), is the frequency of using technological tools in a particular period of time. Moreover, this study view that actual use is the occurrences of a user to apply basic programs of the computer in his office task.

Actual use is the mediating variable of this study. The introduction of mediating variable is in line with the opinion of Baron and Kenny, (1986) explains that actual use can be the third variable to connect between A & B, as C in mediating the relationship between A & B. In the words of Tondeur, Van Braak, & Valcke (2007), Actual use is defined as “the frequency of using technological tools in a particular period of time”. Actual use of technology can therefore be defined in the perspective of this study as the occurrences of a user to apply basic programs of the computer in his office task.

These dimensions seem significant when non-teaching staff contrast advantages between the technological facilities and the pioneer practices, thus, effective management, easy process, satisfaction and convenience (Lin, 2007). More so, accuracy, social benefit, easy process, and time saving are the determining elements (Moore & Benbasat, 1991) when concluding to adopt the new ICT facilities or not. Many literatures on information and communication technology, have presented reasonable clarifications on the best combination and relevant of theses constructs of technology acceptance model (Davis, 1986) and functioning together with the construct perceived ease of use (Moore & Benbasat; Carter & Belenger, 2012; Tylor & Todd, 1995; Siyam, 2019; Zuiderwijk, Janssen, & Dwivedi, 2015).

Another relevance show clearly that the constructs are determining perception about the features of technology perceived usefulness and actual use that is more relevant that directly rooted in Tam (Davis et al., 1986). The argument headed to continue use

of actual use of technology construct with perceived ease of use and the perceived usefulness in a number of research studies (Kucukusta, Law, Besbes, & Legoharel, 2015; Rouibah, 2009; Mallat, Rosi, Tuunainen, & Oorni, 2006; Elkaseh, Wong, & Fung, 2016). The proposition on the appearing of relevancy of the technology acceptance model and theory of reasoning action TAM and TRA constructs educated the decision of certain researchers to examine the combined effect of choosing variables TAM and TRA on perception to use technological attributes (Moga, 2010; Moga, & Constantin, 2012; Salehi, Hayati, & Chin, 2012; Wan Ismail, Kit, Chan, Buhari, & Muzaini, 2012). Transformation, a body of literature through perceived usefulness and perceived ease of use an important, influential factor mediating the relationship between the usefulness of result and intention to use technology (Elkaseh, Wong, & Fung, 2016; Abdullahi, Ward, & Ahmed, 2016). Actual Use of technology, according to the scholarly view entails the frequency of using technological tools in a particular period of time (Tondeur, Van Braak, & Valcke, 2007). Moreover, this study view that actual use of technological facilities is the occurrences of a non-teaching staff to apply basic programs of a computer in his/her office task, over the old-style practices. Having including the concept of the perceived usefulness of TAM, actual use enhances of effectiveness, availability, efficiency, accessibility, comfortability, convenience, time and cost saving (Shareef, & Dwivedi, 2011).

In line with the proposition, actual use is pervasive with massive implications among numerous adoption constructs. Moreover, despite the possible similarity of perceived usefulness and actual use, in the relationship between the constructs of the theories,

has rarely been explored as a sign of the literature stated user-friendliness and convenience as the predecessor of actual use, which in the other hand influence staff's intention to adopt technology (Siyam, 2019). Thus, useful friendliness and convenience are determining factor of actual use as a background of intention to use. The findings straggling the influence of technological facilities, easy perception of using and this study variables of ICT adoption intention, nonetheless, the prospective mediating effect of actual use of technology adoption in the relationship between ICT facilities, social influence and staff performance have been discovered regardless of understood suggestion of the literature.

3.12 Demographic Factors

Flow of ICT adoption originates with the individual acceptance as the most effective factor for providing difference in the adoption level. Demography, including gender, age, educational level, income, race, belief and culture background etc. This is the type of factors that differentiate individuals' adoption level, thus offering first-hand information to policy makers and companies, on different desires, as well as the thoughtfulness of numerous sector of the community. Past literature have recorded results of the effect of numerous demographic physical characteristics, on willingness to adopt technology (Johnson, Wisniewski, Kuhlemeyer, Isaacs, & Krzykowski, 2012; Kukulska-Hulme, 2012; Quazi, & Talukder, 2011; Sabi, Uzoka, Langmia, & Njeh, 2016), signposted influence of psychological decision to technology adoption, particularly in education on individual cogent decision whether to adopt or not.

3.13 Hypotheses Development

The background of the main variables of this study set for hypotheses formulation has been highlighted. Hypotheses for this study have been formulated with the aid of literature on the relationship between the predicting variables and the dependent variable (DV). Similarly, the prospective interactive effect of mediating construct in the relationship between all the independent variables and the dependent variable was hypothesized.

This study has six (6) independent variables, including, perceived usefulness, perceived ease of use, intention to use, attitude toward use, social influence and actual use as a mediating variable, influence the dependent variable (staff performance) using ICT adoption. Sixteen (16) hypotheses were formulated for empirical testing and validation.

3.13.1 Perceived Usefulness (PU) and Staff Performance (SP)

A certain number of literature showed that usefulness in technology is positively related to adopt, this means that the higher the usefulness in the technology the greater the performance through adopt and in this regard perceived usefulness is a predictor of staff performance through ICT adopt (Roberts, Schutter, Franks, & Radina, 2019; Wu, & Ke, 2015; Tubaisat, 2018). Therefore, findings of an empirical survey conducted on elements affecting intention to adopt ICT facilities in governmental services at various stages of maturity in Canada show that perceived usefulness of the system and is an important positive predictor of adoption at interactive stage (Shareef,

Kumar, Kumar, & Dwivedi, 2011). Authenticating positive significant relationship between usefulness in the technology and staff performance.

Moreover, Yueh, Lu, & Lin (2016) conducted a study on employees' acceptance of Mobile technology, in a workplace. With the reason to analyze the antecedent situation of work performance as well as performance expectancy, social influence, facilitating condition, and which amalgamation of them better leads to a greater amount of performance if in the workplace mobile technology were used. The findings, therefore, recommended that using mobile technology in a work place influences employees' performance positively.

Nevertheless, the results of the influence of usefulness in technology on the interest to use technology for effective performance are inconclusive. Although findings (Belanger & Carter, 2012; Wu, & Ke, 2015; Tubaisat, 2018; Carter & Belanger, 2012) showed the relevant relationship of ICT adoption and conclusion to adopt for effective service delivery. Inversely, the findings of these studies, therefore, are in contrast with these studies (Alomari, wood, & sandhu, 2012; Carter, & Belanger, 2004) who found the relationship non-significant on technology acceptance in the public governmental organization.

The consistent results recommended that evaluating staff perception in technology in relation to intention to adopt continue to be emphasis of many research studies, this one included. In this regards, this study intends to observe the influence of non-teaching staff' usefulness in technological facilities for the staff performance using

technological attributes in public tertiary institutions of Bauchi, Nigeria, and in the pursuit of consistent results (Baron & Kenny, 1986). This is particularly in view of the need for theory focused on empirical studies on the nature and previous experience of usefulness in the particular context of internet established transaction (Lee, & Turban, 2001). In line with the research question one of this study, we hypothesize that,

- H¹. There is a positive relationship between the perceived usefulness (PU) and staff performance
- H¹² Perceived usefulness of ICT adoption (PU) has significant impact on actual use (AU)

3.13.2 Perceived Ease of Use (PEU) and Staff Performance (SP)

According to Venkatesh and Davis's (1996), discoveries, perceived ease use is the significant determinant of computer self-efficacy. Empirically, perceived ease of use was established to have a direct effect on the intention to use technology (Teo, 2009a). This construct perceived ease of use, is also among the key construct in technology adoption behavior. TAM partakes spread utilization for examining a person's behavior, (Davis, 1989). According to Surendran, (2012), based on Technology acceptance model, the PEOU factor is the key factor within technology adoption behavior. In many forms of information systems, has been broadly utilized to examine single technology acceptance behavior (Davis, 1989). He suggests PU as well as PEOU known as major concepts, touching individual adoption.

In a training environment, perceived ease of use and is a significant trainee feature concerning e-learning circumstances, particularly, in the initial stage of the user experience (Venketesh, 2000). Likewise, Hauser, Paul, and Bradley (2012), in their study discovered that general computer self-efficacy was correlated with the specific computer self-efficacy positively, and henceforth, positively correlated with the performance.

A study that examined the effect of Perceived usefulness and perceived ease of use, with employee intention to use e-training in Nigeria, Alkali & Abu-Mansur (2017). The findings revealed that trust, perceived ease of use and perceived ease of use have a direct positive influence on an employee intention to use e-training. The above proposition suggested that general efficacy extent is a predictor of intention to use to an extensive range of technological progressive products (Mathieson, 1991).

In a study on Technology acceptance model, was established to have a positive effect on behavioral intention and the solid antecedent of perceived ease of use in the technology acceptance model (Ohk, Park, & Hong, 2015). The results of the study by Ibrahim, Zakaria, & Othman, (2018) revealed that numerous profiles that effect “perceived ease of use” behavior that can be functional by market firm and policy makers to supplement additional dimensions in green product marketing strategies. It can be assumed that the direct effect of perceived ease of use has been tested on intention to use in another situation of technology adoption studies (Hamid, Razak, Bakar, & Abdullah, 2016), this study examined the relationships between both predictors and criterion variables, thus, perceived usefulness, perceived ease of use

and continuance intention to use technology respectively. The finding shows that perceived usefulness and perceived ease of use were proved positively related to persistence intention to use e-government and able to explain a total of fifty-six percent variance. Another study in the same vain, Elkaseh, Wong, and Fung (2016) conducted a study on perceived ease of use and perceived usefulness of social media for e-learning in Libyan higher education. The study base of the technology acceptance model, which highlights on perceived ease of use and the perceived usefulness composed with behavior intention to use current technological facilities, is used for testing the element of using social networking for e-learning in Libyan tertiary institutions. The results of the study show that the perceived ease of use and the perceived usefulness are significant elements for predicting a students' and teachers' behaviors intention to use social networking media for a technological method of knowledge acquiring in Libyan tertiary institutions. Furthermore, self-efficacy was used as a predecessor of perceived ease of use (Chen et al., 2009; Park & Chen, 2007; Punnoos, 2012), and perceived usefulness (Scott & Walczak, 2009). The essential for examining the effect of perceived ease of use as a predictor of staff performance using ICT adoption is equally recommended (Gefen, & Straub, 2000; Gangwar, Date, & Ramaswamy, 2015). In line with research question one, this study hypothesized that,

H². There is a positive relationship between perceived ease of use (PEOU) and staff performance.

H¹³ Perceived ease of use of ICT facilities (PEU) has significant impact on actual use (AU).

3.13.3 Intention to Use (ITU) and Staff Performance (SP).

Accordingly, Ouellette & Wood (1998) clarified that the intention is able to deliberately predict behavior by a device of regulator intellectual methods and that intentions are designed from soundless beliefs concerning the results of an act. Consequently, intention is a mirror image of attitudes in the direction of the behavior of execution an act whose penalties is perceived as encouraging. So as result, attitudes are connected to behavior over and done with their influence on behavior intentions. It was advised that person's behavior intention affects his or her behavior when the behavior interrogation is in volitional regulator. Yet again, Ajzen (1991); Campbell have the view that human behavior is greatly predicted by the dispositions of behavior thus, social attitudes and personality traits. Likely, as long as the individual has a control, performance influence by the intention, whereas performance rises with individuals' behavior control equally motivated to an amount of making try. Jajzen (1991) worried that as an over-all rule, the sturdier the intention to take part in a behavior the more to be expected should be its performance.

A considerable number of literature showed that the intention to use technology is positively related to employee performance, this means that the higher the intention to use technology, the greater the effective performance, and as such, intention to use and technology adopt (Maruping, Bala, Venkatesh, & Brown, 2017; Belanger & Carter, 2012; Wu, & Chen, 2017; Baptista, & Oliveira). Lack of trust will deny intention to for consumers from attracting in online transactions (Lee, & Turban, 2001).

Similarly, findings of empirical studies conducted on the elements affecting intention to adopt technology at various stages of services maturity in Canada show that trust in technology is a significant positive predictor of intention to adopt technology services at attracting level (Shareef, Kumar, Kumar, & Dwivedi, 2011). Nonetheless, the results of the influence of confidence in technology that will lead to intention to adopt that will eventually enhance effective performance (Maruping, Bala, Venkatesh, & Brown, 2017). In contrast, the findings of the studies conducted and found non-significant relationship between intention to adopt technology and the real adoption of technology, (Alomari, Woods, & Sandhu, 2012; Tarhini, Masa'deh, Al-Badi, Al-majali, & Alrabayah, 2017; Carter & Malenger, 2004). In line with the research question one of this study, we hypothesized that,

H³. There is a positive relationship between Intention to use (ITU) and staff performance (SP)

H¹⁴ Intention to use ICT facilities (ITU) has significant impact on actual use (AU)

3.13.4 Attitude toward Use (ATU) and Staff Performance

In the theory of reasoning action (TRA), a behavior is suggested to be strong-minded by a person's aim to achieve the conduct and 'intention' is a task of that individual's approach in the direction of the manners and his or her 'personal norm' (Ajzen & Fishbein, 1980). Although 'attitude toward behavior' mentions to the extent of desire a person develops from carrying out a conduct, a personal custom is well-defined as the degree to which an individual is inspired to obey with the opinions others grasp

about that conduct. The theory of planned behavior (TPB) is a scope of the theory of reasoning action (TRA), which comprises perceived behavioral control. It is well-defined as the aspects that affect an individual's view of how easy or hard it would be to execute a behavior (Ajzen, 1991).

According to Hsu & Lin, (2008), attitude toward use refers to the user preferences when using the technological instrument. This study explains attitudes toward use as the mount to which an individual behavior has a favorable and desirable attitude toward using ICT tools in discharging official task. Empirical studies' findings revealed that attitudes towards mobile learning, technology is a significant element that helps in determining whether or not students and teachers are ready to use mobile learning. Such attitudes will function to recognize strengths and weaknesses and enable the progress of the technology infrastructure (Al-Emran, El-Sherif, & Shaalan, 2016). The result reveals important differences among the students' attitudes towards mobile learning in line with their smartphone ownership, nation and age.

Moreover, many empirical studies conducted found a positive relationship between attitudes toward use of technology and the actual adoption, such as (Diney, Albano, D' Atri, & Hart, 2016; Heflin, Shewmaker, & Nguyen, 2017; Akcayir, Akcayir, Pektaş, & Ocak, 2016).

There is overwhelming backing of preceding research studies, in which attitudes of the individual toward use of technology found to be positively related to a rate of

adoption (Kim, Lee, Mun, & Johnson, 2017; Ramos-de-Lune, Montoro-Rios, & Liebana-Cabanillas, 2016). Studies of technology adoption, empirical predict behavioral results, by examining the relationship between attitude and intention, even though the intention may not be the greatest predictor of actual behavior (Shropshire, Warkentin, & Sharma, 2015). The results therefore, revealed that the moderating influence of personality is highly increases the quantity of variance explained in the actual use. In line with the research question, we however proposed thus;

H⁴. There is a positive relationship between Attitudes towards use (ATU) and staff performance

H¹⁵ Attitude toward use of ICT facilities (ATU) has significant impact on actual use (AU).

3.13.5 Social Influence (SI) and Staff Performance

Theory of reasoned action (TRA) as a theory of technology adoption expected that an individual's behavioral intention to carry out or not assured objective behavior, is directly and exclusively answerable for influencing that person's aim behavior or an intention of the individual is supposed to be cooperatively decide by the two influences: subjective norms and attitudes towards the behavior (Fishbein & Ajzen, 1975). Social influence according to Venkatesh et al. (2003), is the degree to which an individuals perceive influencers and individuals of significance reflect the entities should be as a result of fresh technology. In addition, this study has the view that social influence is the degree to which an individual thought, feelings, attitudes and behavior change or influence as a result of interaction with ICT facilities. Social influence

entails the amount to which an individual believes persons who are significant to him or her, needs him/her to do a certain behavior (Lee, 2010; Liao, Chen, & Yen, 2007; Venkatesh et al., 2003).

In a study that examined predictor of information and communication technology adoption, Hsu, & Lin (2008) found significant connecting relations between social influence and technology acceptance. Based on the TRA they established a model concerning technology adoption, knowledge sharing, and social influences. In fact, social influence is found to have been the utmost causal predictor of technology adoption (Li, 2011). The empirical study, unites social ability and status; perceived enjoyment and three processes of social influence (compliance, identification and internalization), to describe the individual intention to use social networks. (Li, 2011). The findings revealed that, social influence affects intention directly through the compliance technique.

According to the preceding studies, social influence elevated to be significant elements towards attitude and behavioral intention of using mobile learning (Briz-Ponce, Pereire, Carvalho, Juanes-Mendez, & Garcia-Penalvo, 2017). Furthermore, in line with the results, the students' ease of perception looks to be the key element affecting the social influence and the dependability for recommending this technology for learning was the major factor that affected the behavioural intention to adopt technology. In line with question one of this study, we hypothesized that;

H⁵. There is a positive relationship between Social Influence (SI) and staff performance.

H¹⁶ Social influence to ICT facilities (SI) has significant impact on actual use (AU)

3.13.6 Actual Use (AU) and Staff Performance (SP)

Actual use, according to Tondeur, Van Braak, & Valcke (2007), is the frequency of using technological tools in a particular period of time. Moreover, this study view that actual use is the occurrences of a user to apply basic programs of the computer in his office task.

The empirical study found that, the relationship between investment in information and communication technology and its influence on organizational performance continues to interest academics and practitioners. They further revealed that, the driver of the information and communication technology effect is not the investment in the technology, but the actual usage of the technology (Devaraj, & Kohli, 2003). Similarly, an empirical study explores the numerous purposes of social media usage and its influence on organizational performance. The study nevertheless, emphasizes only on the social media managers' views (Parveen, Jaafar, & Amin, 2015). The results show that social media has a higher effect on the performance of organizations in terms of improvement in customer relations and customer service accomplishments.

The proposition on the appearing of relevancy of the technology acceptance model and theory of reasoned action TAM and TRA constructs, educated the decision of certain researchers to examine the combined effect of chosen variables of TAM and

TRA on perception to use technological attributes (Moga, 2010; Moga, & Constantin, 2012; Salehi, Hayati, & Chin, 2012; Wan Ismail, Kit, Chan, Buhari, & Muzaini, 2012). The transformation, a body of literature through perceived usefulness and perceived ease of use, an important influencing factor mediating the relationship between usefulness result and intention to use technology (Elkaseh, Wong, & Fung, 2016; Abdullahi, Ward, & Ahmed, 2016). Actual Use of technological facilities, according to the scholarly view, details the frequency of using technological tools in a particular period of time (Tondeur, Van Braak, & Valcke, 2007). Moreover, this study view that actual use of technological facilities is the occurrences of a non-teaching staff to apply basic programs of a computer in his/her office task, over the old-style practices. Having including the concept of the perceived usefulness of TAM, actual use enhances of effectiveness, availability, efficiency, accessibility, comfortability, convenience, time and cost saving (Shareef, & Dwivedi, 2011)

3.13.7 Empirical Association between the Independent Variables (PU, PEU, ITU, ATU, and SI), Mediator (AU) and the Dependent Variable (SP).

Literature stated that positive relationships between actual use and intention to adopt. For instance, Devaraj, and Kohli (2003) and Parveen, Jaafar, and Amin (2015) found significant effects of actual use on intention to use technology for effective performance. The results show that social media has a higher effect on the performance of organizations in terms of improvement in customer relations and customer service accomplishments.

However, the construct is rarely verified in relation to the non-teaching staff cogent decision to adopt ICT facilities for effective performance. Likewise, technology acceptance scholars have investigated the interrelationship among the main variables of TAM in which perceived usefulness is established to have robust predictive power of intentions to use, while perceived ease of use is lower and functions through perceived usefulness (Davis, Bagozzi, Warshaw, 1989; Davis, 1989; Igarria, Zinatelli, Cragg, & Cavaye, 1997).

More so, Salehi, Hayati, Karbalaee and Chin (2012) and Rezaei-Moghaddam, and Salehi (2010) postulated that through perceived usefulness and perceived ease of use as mediating variable, triability have a relationship with the intention to adopt correctness agricultural technology. In another word, perceived usefulness and perceived ease of use mediate the relationship between perceived triability and intention to adopt; and perceived observability and intention to adopt. The results of the findings of Rezaei-Moghaddam, and Salehi (2010) showed the significant positive mediating effect of perceived ease of use in the relationship between perceived triability and intention to adopt and perceived observability and intention to adopt. Whereas, perceived usefulness mediate the relationship between perceived observability and intention to adopt.

Additionally, some literature revealed the mediating relationship between diffusion innovation theory and constructs and technology acceptance model constructs. For example, results of semi metal-analysis by Legris, Inghamb, Colletettec (2003) described that perceived usefulness used in mediating the relationship between results

demonstrability and intention to use. Likewise, postulated and validated were mediating influence of attitudes in the relationships between triability, observability as well as behavioral intention to adopt (Chen et al. 2009; Park & Chen, 2007), buttressing the postulation that perceived observability influences individual intention to adopt through indirect influence of attitude.

Pearranged the mediating influence of perceived usefulness and perceived ease of use to an extensive range of adoption variables (Chen, Yen, & Chen, 2009; Hsu, Wang, & Chiu, 2008; Park & Chen, 2007), as well as the unarguable likeness of perceived relative advantage and density constructs of diffusion innovation theory with perceived usefulness and perceived ease of use constructs of technology acceptance model in the literature (Shareef et al. 2011), the transformation implicitly recommended prospective mediation of actual use in the relationship between Information and communication technology attributes and other adoption variables.

Findings of Hsu, Wang, and Chiu, (2008) presented that individuals with high statistical software self-efficacy feels a higher degree of mastery of statistical software applications than the individual with low mastery of statistical software applications. The study examines the statistical software of self-efficacy and computer attitude lead to positive and significant effect on perceived usefulness, a replacement actual use of technology acceptance model. Nevertheless, both the two exterior variables of statistical software, self-efficacy and computer attitude did not have a positive influence on perceived ease of use. In this study of Lee, Yen, and Joshi (2011) and

Chen, Chen, and Yen (2011) revealed that both assisted self-efficacy and individual are forecasters of behavioral intention and perceived ease of use, yet, on assisted self-efficacy is found robust precursor for perceived usefulness. This means, self-efficacy has a significant effect on perceived ease of use, whereas it only partly affects perceived usefulness.

Additionally, the attitude toward use of technology was found to be a significant predictor of behavior intention to adopt information and communication technology (Chen et al., 2009; Park & Chen, 2007) they hypothesized as well as validate that mediating influence of attitude toward use in the relationship between self-efficacy and behavior intention to adopt. Perceived ease of use of technological attributes, has been influenced by self-efficacy and in turn influences behavior intention to use smart-phones. The impression is a sign that behavioral intention to adopt inventive practices in this regard ICT adoption or e-administration has much to be discovered from the perceived psychological capability of oneself in relation to the technology and the course of action (Bandura & Adams, 1977). Keeping in mind, the combining technology acceptance model (TAM) with theory of reasoning action (TRA) construct, more importantly the is testing the mediating influence of actual use (AU) of technological attributes as a predictor of staff performance (SP) using ICT adoption. This study for that reason, propositions to explore the mediating role of actual use of technology (AU) in the relationship between the perceived usefulness (PU), perceived ease of use (PEU), intention to use (ITU), attitude toward use (ATU), social influence

(SI), and staff performance using ICT adoption. This is for the purpose of answering research question two of this study.

- H⁶. There is a positive relationship between actual use (AU) and staff performance.
- H⁷. Actual use mediates the relationship between the perceived usefulness (PU) and staff performance
- H⁸. Actual use mediates the relationship between perceived ease of use (PEOU) and staff performance
- H⁹ Actual use mediates the relationship between Intention to use (ITU) and staff performance
- H¹⁰ Actual use mediates the relationship between Attitudes toward use (ATTU) and staff performance.
- H¹¹ Actual use mediates the relationship between Social Influence (SI) and staff performance.
- H¹² perceived usefulness of ICT adoption (PU) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).
- H¹³ perceived ease of use of ICT adoption (PEU) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).
- H¹⁴ Intention to use of ICT adoption (ITU) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).
- H¹⁵ Attitude toward use of ICT adoption (ATU) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).

H¹⁶ Social influence of ICT adoption (SI) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).

3.14 Conceptual Model

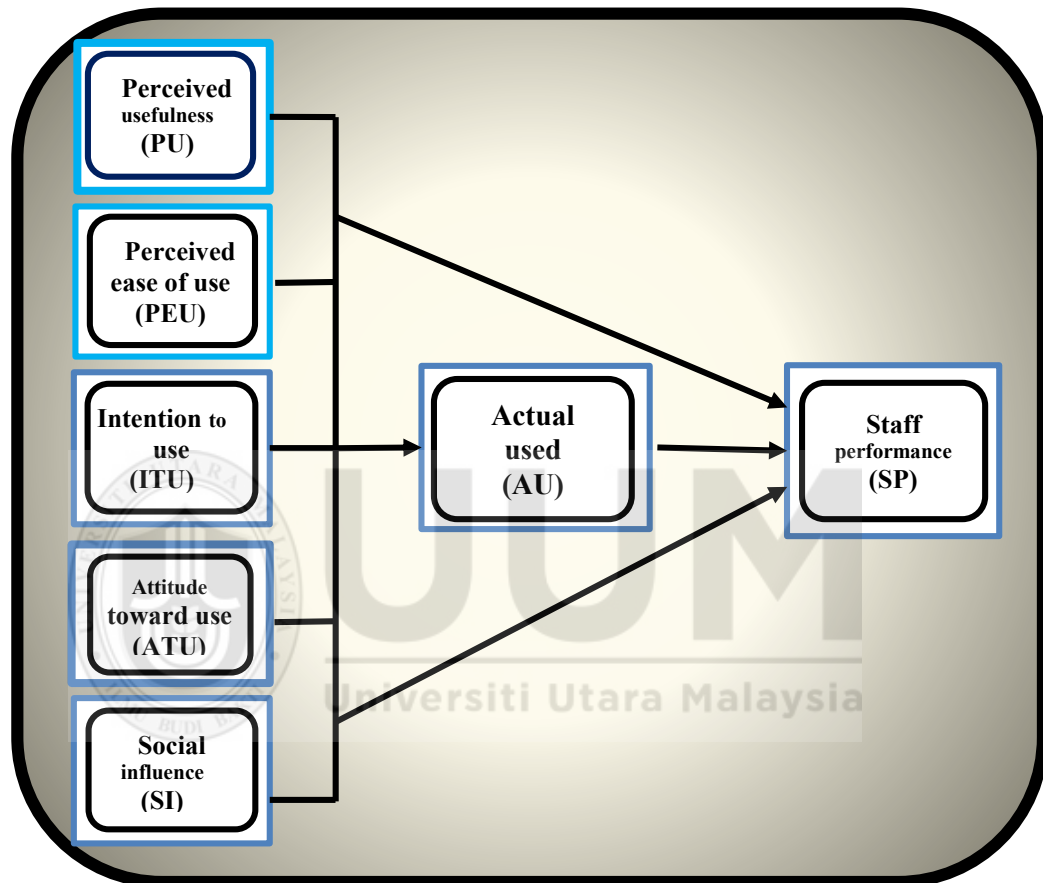


Figure 3.1
Conceptual Model of ICT Adoption and Staff Performance

This research model is adopted and modified, from TAM (Davis, 1989), known as the standard Information System theory established to describe technology adoption behavior as well as factors related to the adoption of the computer and internet services. It has been established on the TRA, which advises as the highest forecaster of behavior is the intention (Fishbein & Ajzen, 1975).

The model displayed the relationship between Independent variables (IVs) and Dependent variable (DV) indirectly through mediating variable intention to use and actual use. The arrows from independent variables signifying the direct relationship between perceived usefulness, perceived ease of use, attitudes towards use, social influence, and intention to use. While the short arrows in the middle indicating indirect relationship from IVs to DV through the mediating variables intention to use and actual use, which concurrently go with the hypotheses of the study. The model shall be used to influence ICT adoption and staff performance in public tertiary institutions in Nigeria, (Baron & Kenny, 1986).

3.15 Theoretical framework

This research work comprises of technology acceptance model theory and social influence theory (TRA) to explain technology acceptance using public service efficiency in tertiary institutions in Bauchi state, Nigeria. Theories and model presentation is brief here in this section. But literature review in (Chapter three) contained thorough explanations of the theories and model. TAM recommended by Davis (1989), is those established IS theory secured to depict PC utilization conduct and variables related acknowledgement of the innovation. Those TAM will be made on the hypothesis of the contemplated movement (TRA), which give advice that the most elevated forecaster for self-destructive considerations and conduct will be the intention (Fishbein & Ajzen, 1975). Those TRA may be especially supportive concerning behavior, concerning illustration it emphasizes that different Components that influence conduct don't do In this way straight, in any case in a roundabout way

Toward influencing disposition Also subjective standard (Davis, Bagozzi, & Warshaw, 1989). Those TAM spreads those TRA and proposes that the factors that observed convenience and recognized the simplicity for utilize determine an individualized plan to utilize technology. As stated by researchers for example, Legris et al. (2003), exploration comes about with TAM always been typically reliable, also that both TAM Furthermore TRA foresee plan great.

Technology acceptance is about explaining how important equality of behavior Intention such as attitudes, beliefs, values etc. Determines the technology acceptance behavior. The theory describes that individual intention to accept or not to accept depends on the judgment of the outcome. However, rarely the meaning of the result includes satisfaction or else with the public service. For example, the implementation of Internet-based applications gives a new room for additional channels for involvement in public affairs for citizens (Kozakova, 2011). This, enable technology acceptance theory to explain technology acceptance using ICT adoption is put to test. Technology acceptance model is, therefore, a rich model capable of providing the reasonable explanation of the rational decision of using ICT in tertiary institutions. The amounts to which technological means strengthen staff acceptance.

Social influences greatly way client conduct. A few theories inform that social influence may be magic for deciding client conduct. For example, On TRA, an individual's behavioral intentions would influenced toward person age standards as cold as the state of mind. Improvement dissemination exploration additionally

recommends that client selection choices, would influenced by social framework, further over an individual's choice, style and the Characteristics of the information technology, from the social, mental and monetary viewpoints. Two classifications about social influence are famous: social standards which have more basic mass. Hypotheses about congruity in social, mental need proposed that one assembly parts bring A propensity about complying with the gathering norm, Also Besides that, these thus influence the recognitions and conduct technique for members (Lascu & Zinkhan, 1999). In economics, perceived critical mass was an externality, often form by the effects of the network, for influencing innovation organization adoption, social standards contain for two separate influences: informational influence, which happens at a client consent to detract majority of the data gotten starting with other clients. Similarly, as evidence something like reality, what's more regularizing influence, which happens at an individual imitates of the anticipations for others to get a reward or avoid a discipline (Deutsch, & Gerard, 1995). These two sorts for influence ordinarily capacity through three differentiate procedures internalization, identification.

Informational influence may be a disguise procedure, which happens when a client perceives majority of the data as enhancing as much or her learning specifically over that for reference aggregations (Kelman, 1961). Regularizing influence will be a system for identification and agreeability. Identification happens the point when a client acknowledges an assessment held eventually Tom's perusing others for the reason that he or she is concerned with defining he or she as interrelated to the group.

Compliance takes place when a user follows to the anticipations of another to obtain a reward or avoid refusal and anger. (1) Reference group theory: Reference group theory shows that individuals look for guidance from opinion leaders or from a group with suitable skill. Therefore, individuals may develop principles and criteria for their behavior by bringing up to inform, normative practices and value terminologies of a group or one more individual (Park, & Lessig, 1977). (2) Group influence procedures: This theory suggests that groups encourage an individual. An individual effort to accept the behavioral norms of the group to make stronger relationships with its members, ever since he or she wants to be narrowly recognized by the group (Goodwin, 1987). (3) Social exchange theory: Social exchange theory opinions relational collaborations from a cost–benefit perspective (Blau, 1964). Giving to this theory, individuals regularly think joint benefits, such as personal love, trust, appreciation, and economic profit, when they act according to social norms.

3.15.1 Technology Acceptance Model (TAM)

Technology acceptance model is chosen because, it is the classical information system (IS) model established to describe computer usage behavior and constructs related to acceptance of technology (Fishbein & Ajzen, 1975). Wide research has been administered exploring the variables related to technology acceptance in an extensive diversity of settings (Agarwal & Prasad, 1998). According to scholars, research results with TAM have been normally reliable, and that both TAM and TRA predict intention well, (Legris et al. 2003). Widespread literature review exploring technology acceptance factors recognized in IS studies, (Legris et al. 2003).

3.15.2 Theory of Reasoned Action (TRA)

Theory of reasoned action is chosen because, is a behavior intention theory, which an individual's behavioral intentions are influenced by personal norms as sound as attitude, (Lascu & Zinkhan, 1999). It has advised that the highest predictor of behavior is the intention (Fishbein & Ajzen, 1975).

Is particularly helpful concerning behavior, as it emphasizes that other factors that affect behavior do not do so straight, but indirectly by influencing attitude and subjective norm (Davis, Bagozzi, & Warshaw, 1989). Davis et al. (1989) advised that a model contained elements from both TAM and TRA might offer a more comprehensive view on the basis of user acceptance.

3.15.3 Scientific Management theory (SMT)

Fredrick Winslow Tylor, in 1911, published his work, called "The principles scientific of management" in which he pronounced how the application of the scientific method to the management of employees significantly could improve efficiency. Scientific management techniques called for enhancing the way that responsibilities were performed and simplifying the jobs enough so that employee could be trained to execute their specialized categorization of motions in the best way (Tylor, 1911).

Moreover, prior to the scientific management theory, work was executed by skilled craftsmen who had learned their jobs in extensive apprenticeships. They made their own conclusions about how their work was to be performed. The scientific management removed away much of this sovereignty and changed skilled crafts into

a sequence of simplified works that could be done by unskilled workers, who easily could be trained for the jobs.

3.16 Summary

This phase contains the review of literature concerning overviews of the broader field of e-government and e-administration within which ICT adoption is to be found. Yet reviewed literature and relevant documents on the foundation theories, as well as supportive, which mounted down to the main constructs of the study. Therefore, in the quantitative part, six (6) hypotheses were formulated for research question one and 10 also formulated for research question two respectively.



CHAPTER FOUR: METHODOLOGY

4.1 Introduction

This chapter concentrated on the general research design that explains the step-by-step process of scientific inquiry which forms the basis of this study. Firstly, the chapter emphasized in the dual parallel methodological design that joint qualitative and quantitative research methodology's approach to data collection and analysis. The Procedure of justification and selection for the research method follows. The chapter is largely separated into two parts, thus, quantitative and qualitative designs of the study. Hence, the population of the study, sample design; techniques of data collection and analysis. Additionally, the face-to-face interviews, and ethical issues were discussed.

4.2 Research Design

This work adopted mixed research design in which quantitative technique was the main paradigm and supported by qualitative design. A phenomenon is socially liable rather than totally deterministic in the perspective of information system. For that reason, neither a purely quantitative technique nor a purely qualitative technique of research all the time provide gorgeous visions, or report the issue of generalization (Venkatesh, Bala, & Brown, 2013). Therefore, mixed method approach to research is the most suitable approach (Weber, 1990). The data have been generated through the instrument of the questionnaire and open-ended interview from the sample size of the population of the staff of Bauchi State Tertiary Institutions across the three senatorial

zones. These comprise of the senior non-teaching staff, middle class staff as well as computer unit staff that operates ICT facilities, respectively. A tabular illustration of research questions and research methods is presented below. Thus, the study uses a cross-sectional research design. It serves time and resources, hence the selected representation of the population. This can permit to retain great environmental validity, since a study looks a lot similar the populaces interested in studying, other than longitudinal design (Kowalczyk, 2015).

Table 4.1
Research Questions and Corresponding Research Design

No.	Research question	Research Design
1.	Does Perceived Usefulness (PU), Perceived Ease of Use (PEU), Intention to use (ITU), Attitude towards Use (ATU), Social Influence (IS), and Actual use (AU), influence Staff to Use ICT Facilities?	Quantitative method
2.	Does Actual use mediate the relationship between Perceived Usefulness (PU), Perceived Ease of Use (PEU), Intention to use (ITU), Attitude towards Use (ATU), Social Influence (IS), and staff performance in public tertiary institutions?	Quantitative method
3.	What are the potential challenges of ICT adoption confronting staff performance in public tertiary institutions?	Qualitative method
4.	What are ICT strategies for improving staff performance in public tertiary institutions?	Qualitative method

The table 4.1 above, shows the unique research approaches adopted to explore the four (4) research questions originally established for this study. The data, both quantitative and qualitative for this work has been collected simultaneously by means of survey and face-to-face interview methods separately.

4.2.1 Convergent Parallel Design

This convergent parallel design adopted by this study, allows the simultaneous gathering of data both quantitative and qualitative (Creswell, 2012). The two sets of data were analyzed separately to relate the outcomes from the analyses of the two sets of data, and interpret and see whether the results backing or negating each other (Creswell, 2012). The design also permits us to use joint results gotten from separate databases to comprehend our research objectives and problems. The analyses of the datasets have been carried out independently. Nevertheless, the two sets of the data have been discussed together and in some occurrences detached given the type of information, research objectives and questions.

The rationale for choosing the design is to improve the strength of one type of data to corroborate the weaknesses of the other form. Therefore, qualitative and quantitative data have been generated separately in two parallel stages two forms of data. The purpose is to elaborate, improve, and complement each other as shows in the Figure 4.1 below:

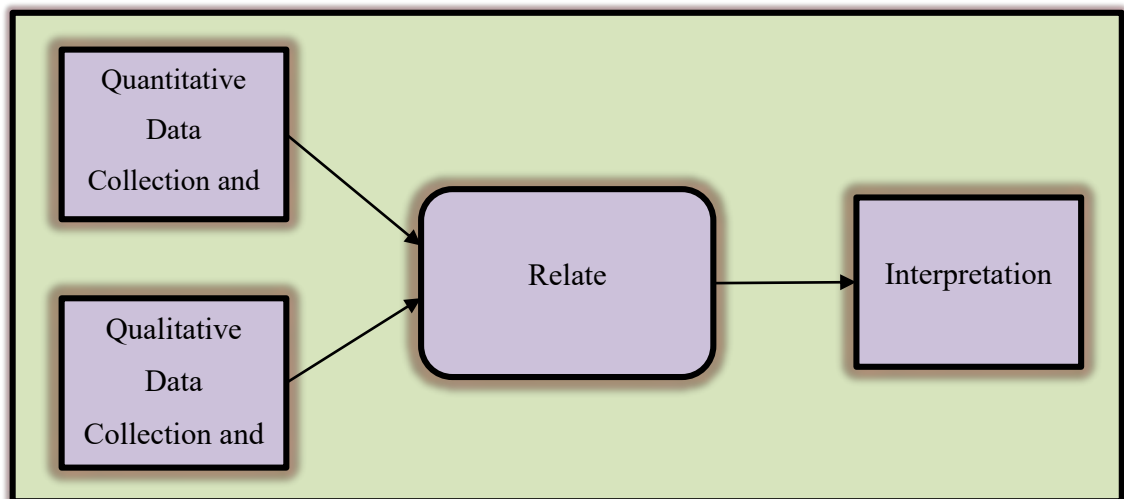


Figure 4.1
Convergent parallel design
 Sources: Creswell (2012)

Consequently, the following are the reasons for Chosen Convergent Parallel Methodological Design:

- i. Originality of the ICT adoption research in Nigeria, particularly in relation to staff performance in tertiary institutions and the need to test appropriate theories to address the problems using samples from Nigeria.
- ii. The need for this research to make available rich, complex and complete picture as well as different viewpoints of staff performance in tertiary institutions using ICT adoption.
- iii. The questions and objectives of this study required the incorporation of comprehensive quantitative statistical strength and the qualitative data details to get a broader and exact information on how ICT adoption influences staff performance in tertiary institutions.

- iv. The requirement to develop and test the quantitative instrument with an investigation of managers' views.
- v. In order to have a better understanding of the research problem and research question rather than using either of the approaches alone.
- vi. The requirement to hear the views and voice of the main stakeholders, particularly the top management, outside the bounded restriction of variables of the quantitative.
- vii. There is the need to develop a detailed view of the meaning of a phenomenon and concept under study and finally generalize the findings to the population.

4.2.2 Quantitative Research Design

This section highlighted the step-by-step procedure of quantitative data collection and analysis. These comprise of the targeted population, sample size and sampling technique; instrumentation; data collection procedure and data analysis were carried out using SPSS for the preliminary analysis, data screening and demographic analysis, whereas Smart PLS 3.0 was used for the main analysis.

4.2.3 Population of the Study

The population of this work was obtained from selected tertiary institutions of the three senatorial zones in Bauchi state, Nigeria. Bauchi state is divided into three senatorial zones. Using simple random probability sampling technique. Thus, the tertiary institutions from Bauchi south zone comprises of Abubakar Tafawa Balewa University, (ATBU) and Abubakar Tatari Ali Polytechnic, (ATAP). The institutions

from the central zone consist of College for legal and Islamic studies (CLIS) and School of Health and Technology (SOH&TECH). The northern zone comprises of the Bauchi State University (BASUG) and Aminu Saleh College of Education (ASCOEA) were randomly selected from the area of the study.

Therefore, our population size of this study is around (1,708) non-teaching staff whose operate computers of the selected tertiary institutions in Bauchi State. Meanwhile, the researchers' inability to access the precise identity and addresses of all the staff, constituting population of the study, indicates the sampling frame. Otherwise, the research adopts that in the group of six (6), some number of staff have been selected proportionate, at random to represent the population of the group as the sampling frame. The table 4.2 below represents the distribution of the population, from the three senatorial zones, selected institutions and staff statistics of the population in Bauchi state, Nigeria.

Table, 4.2

Population distribution of the three senatorial zones, selected Institutions, location, and the staff total in Bauchi State, Nigeria.

No.	Senatorial Zone	Institution	Location	Staff
1.	South	Abubakar Tafawa Balewa University (ATBU)	Bauchi	983
2.	South	Abubakar Tatari Ali Polytechnic (ATAP)	Bauchi	229
3.	Central	College for legal and Islamic studies (CLIS)	Misau	154
4.	Central	School of Health and Technology (SOHTECH)	Ningi	14
5.	North	Bauchi State University (BASUG)	Gadua	90
6.	North	College of Education (COE)	Azare	238
Total				1,708

Source: From the statistics of the various institutions developed for this research.



Figure. 4.2

Map of Bauchi state illustrating the 20 local governments from three senatorial zones

Sources: USAID Bauchi State, Nigeria, routing immunization system, (Baseline Report, 2007)

4.2.4 Sample size and Sampling techniques

The sample size of the population of the staff of the selected Tertiary Institutions in Bauchi State was randomly selected using the stratified random sample technique. A stratified sample involves putting the population into non-overlapping groups called strata, putting those groups also into non-overlapping groups, and a sample is selected from each stratum. Therefore, sampling from each of the groups at the lowest level of

the group. In the group of six (6), 500 number of staff have been selected at random to represent the population of the group.

Dillman (2007) formulas, determined the sample size of this research. The researcher adopts margin error (confidence interval) of ± 5 and a confidence level of 95% as follows:

$$N_s = \frac{(NP) (P)(1 - P)}{(NP - 1) (B/C)^2 + (P) (1 - P)}$$

$$NS = \frac{(NP) (P) (1-P)}{(NP-1) (B/C)^2 + (P) (1-P)}$$

Where:

$N_s = ?$

$N_p = 1,708$

$P = 0.5$

$B = 0.05$

$C = 1.96$

$$N_s = \frac{1,708 \times 0.5 \times (1 - 0.5)}{(1,708 - 1) (0.05 \times 1.96)^2 + (0.5) (1 - 0.5)}$$

$$\frac{1,708 \times 0.25}{1,707 \times 0.00065 + 0.25}$$

$$\frac{427}{1.3602}$$

$$N_s = 313.92 = 314$$

The approximate sample of 313.92 was selected in conformity with the proposed rule of scan for a sample size of population extent from 1,000, 000 up to 1, 000, 000, 000 according to Krejcie and Morgan's (1970) easy tables. Likewise, Dillman (2007) recommended that at a time once the population size become into tens of thousands, dissimilarities in the sample size do not determine the level of accuracy. Yet, in order to take care of the possibility of sample size error and non-respond problem; so also to raise the level of perfection and possible generalizability, the sample is greater than before to five hundred (Hair, Ortinau, & Bush, 2003; Hair, Ortinau, Bush, & Wolfinbarger, 2009).

To observe the population variability, the study adopted stratified sampling technique. Firstly, the approximate five hundred questionnaires were distributed according to the number of staff within the strata, as presented in table 4.3 below.

Table 4.3
Proportionate Distribution of Questionnaire

Sn.	Institutions	Staff	% (n)	(n/100x500)
1.	Abubakar Tafawa Balewa University (ATBU)	983	57.55	288
2.	Abubakar Tatari Ali Polytechnic (ATAP)	229	13.41	67
3.	College for legal and Islamic studies (CLIS)	154	9.02	45
4..	School of Health and Technology (SOH&TECH)	14	0.82	04
5.	Bauchi State University (BASUG)	90	5.27	26
6.	College of Education (ASCOE)	238	13.93	70
Total		1, 708	100%	500

The above table 4.3, has presented number of staff who operate computers in their respective institutions, their percentages and proposed proportionate questionnaire distribution based on the sample size of each institution.

4.3 Instrumentation

The measurement of constructs and dimensions of this research is built on the operational definition (operationalization), as an essential aspects of quantitative studies, and the measurements available within the related literature. It comprises a systematic description of the essential elements of a given population that is interested to be studied, by allocating reliable and valid numbers (Zikmund, et al., 2009 & Sekaran & Bougie, 2009). All scales measurements were valid and reliable tested. Hence, the study adapted and modified the demographic characteristics of (Saleh & Dew, 2014).

4.4 Operationalization of Constructs

Major constructs' operational definitions, comprising of staff performance, perceived usefulness, perceived ease of use, attitudes toward use, social influence, intention to use and actual use as presented in Table 4.5

Table 4.5

Operational definition of Constructs (Operationalization)

Sn.	Constructs	Definition	Source
1.	Staff performance	Staff performance is a point to which the work associated activities anticipated of an employee and how perfect those responsibilities were expected to be accomplished.	(Foah 2014)
2.	Perceived usefulness	Refers to as the amount to which an individual perceived that using an information and communication technology (ICT) enhances his or her performance.	Hsu & Lin, (2008)
3.	Perceived ease of use	The degree to which an individual perceived that using an information and communication technology (ICT) is free of effort.	Hsu & Lin, (2008)
4.	Attitudes toward use	Defined as an emotional reaction that expresses users' amount of preferences when using technology.	Hsu & Lin, (2008)
5.	Social influence	Social influence is the degree to which individuals perceive influencers and individuals of significance reflect the entities should be as a result of fresh technology.	Venkatesh et al. (2003).
6.	Intention to use	Is the extent to which the user would like and intends to use information and communication technology (ICT) in the	Hsu & Lin, (2008)
7.	Actual use	Actual use is the frequency of using technological tools in a particular period of time.	Tondeur, Van Braak, & Valcke

4.4.1 Measurement of Study Constructs

The measurement of the main constructs of this study was carried out by extensive review of the existing literature and provided the survey instruments by using diverse items. Therefore, the items adapted were validated by other researchers in ICT-adoption, e-learning adoption, e-government adoption and other various technology

adoption to outfit the context and content of this study. Nevertheless, preceding studies showed high scores for validity and reliability of the measured items, in this study items have been subjected to numerous stepladders of reliability and validity test and satisfied the requirements to measure the planned constructs. So also, we indicated that mixing positively and negatively statements should be avoided in order to prevent possible frustration and confusion from the respondents to ensure the accuracy, quality and quantity of the data (Churchill, 1979).

4.4.1.1 Study constructs and Items

This study has adapted the measurement items for all the constructs under study. Therefore, the constructs, the number of items and sources, were illustrated on a tabular form. Thus, Perceived usefulness has 9, Perceived ease of use 8, Attitudes towards use 8, Intention to use 8, Actual use 6, Social influence 7, and staff performance 6 items as shown in Table. 4. 5, to 4.12 below:

Table 4.6

Construct: Perceived usefulness

SN	Item(s)	Source(s)
1.	ICT helps to improve my knowledge	Mohammadi, (2015)
2.	ICT helps to improve my performance	Mohammadi, (2015)
3.	ICT helps to save cost	Mohammadi, (2015)
4.	Using ICT enables me to accomplish tasks more quickly	Chin et al. (2008)
5.	Using ICT improves my ability to accomplish tasks	Chin et al. (2008)
6.	Using ICT increases my productivity	Chin et al. (2008)
7.	Using ICT enhances my effectiveness in accomplishing	Chin et al. (2008)
8.	Using ICT makes it easier to do my task	Chin et al. (2008)
9.	I found ICT useful in my task completion	Chin et al. (2008)

Table 4.7

Construct: Perceived Ease of use

SN	Item(s)	Source(s)
1.	ICT is easy to use	Mohammadi, (2015)
2.	ICT is easy to learn	Mohammadi, (2015)
3.	ICT is easy to access	Mohammadi, (2015)
4.	ICT is easy to understand	Mohammadi, (2015)
5.	ICT is convenient	Mohammadi, (2015)
6.	I found ICT flexible to interact with	Davis, (1989)
7.	It is easy for me to become skilful at using ICT	Davis, (1989)
8.	My interaction with ICT is clear and understanding	Davis, (1989)

Table 4.8

Construct: Attitude towards use

SN	Item(s)	Source(s)
1.	Working with ICT offer real advantages over traditional method of work	John, (2015)
2.	I like using ICT for discharging my responsibility	John, (2015)
3.	I think Staff and Students should use ICT in all subject matters	John, (2015)
4.	I think ICT can be effectively implemented as working instrument	John, (2015)
5.	I think Staff and Students should be using ICT to access relevant materials	John, (2015)
6.	I think it is worthwhile to use ICT	John, (2015)
7.	I have a generally favorable attitude toward using ICT	Fathema, Shonnon, and Rose, (2015)
8.	In my opinion, it is very desirable to use ICT in discharging my duty	Fathema, Shonnon, and Rose, (2015)

Table 4.9

Construct: Social Influence

SN	Item(s)	Source(s)
1.	People who influence my behaviour will think that I should use ICT	Mtebe and Raisamo (2014)
2.	People who are important to me will think I should use ICT	Mtebe and Raisamo (2014)
3.	Staff who uses ICT have more prestige	Mtebe and Raisamo (2014)
4.	The staff at my institution will be helpful in the use of ICT	Mtebe and Raisamo (2014)
5.	Staff who uses ICT are considered to be smart	Maina and Nzuki, (2015)
6.	In general, my institution will support the use of ICT	Maina and Nzuki, (2015)
7.	Using ICT adds to my status among my Colleagues	Maina and Nzuki, (2015)

Table 4.10

Construct: Intention to use

SN	Item(s)	Source(s)
1.	I intend to use ICT in the future	Mtebe and Raisamo, (2014)
2.	I predict I would use ICT in the future	Mtebe and Raisamo, (2014)
3.	I plan to use ICT in the future	Mtebe and Raisamo, (2014)
4.	I intend to use ICT to assist in my primary responsibilities	Fathema, Shonnon, and Rose, (2015)
5.	I intend to use ICT as often as possible	Fathema, Shonnon, and Rose, (2015)
6.	I intend to use ICT	Mohammadi (2015)
7.	I believed that the use of ICT is available	Mohammadi (2015)
8.	I am likely to use ICT in the near future	Mohammadi (2015)

Table 4.11

Construct: Actual use

SN	Item(s)	Source(s)
1.	I use the correct terminology with computer in my office work	Tondeur, Van Braak, & Valcke (2007)
2.	I use the elementary functions of computer in performing my duties	Tondeur, Van Braak, & Valcke (2007)
3.	I share my office data with computer	Tondeur, Van Braak, & Valcke (2007)
4.	I apply operating systems of computer in my office operations	Tondeur, Van Braak, & Valcke (2007)
5.	I apply basic programmes of computer in my office task	Tondeur, Van Braak, & Valcke (2007)
6.	I apply safety provisions base on computer in my office operations	Tondeur, Van Braak, & Valcke (2007)

Table 4.12

Construct: Staff performance

SN	Item(s)	Source(s)
1.	If I use computer, I will be better organized.	Deborah and Higgins (1995)
2.	If I use computer, I will increase my effectiveness on the job.	Deborah and Higgins (1995)
3.	If I use a computer I will spend less time on routine job task	Deborah and Higgins (1995)
4.	If I use a computer, I will increase the quality of output of my job.	Deborah and Higgins (1995)
5.	If I use a computer I will increase the quantity of output for the same amount of effort	Deborah and Higgins (1995)
6.	If I use a computer, I will be less reliant on clerical supporting staff.	Deborah and Higgins (1995)

4.4.1.2 Five (5) Points Likert Scale

This research adopted five (5) points Likert scale as a replacement for the unique seven-point likert scale. The five (5) points Likert scale response as a layout of

gathering the interval data has a range from strongly agree represented by '5' to strongly disagree represented by '1'. The scale is carefully chosen in order to guarantee adequate thoughtfulness in differentiating individuals based on variables of interest (Sekaran & Bougie, 2009). Under investigation, it has the prerequisite feeling to accurately observe changes in theoretical constructs. Furthermore, the five-likert scale selection was based on the various advantages of the scale over other ones. It has been reported that the scale has been the most efficiently used in behavioural

Technology and science adoption researches with additional encouraging response (Peter, 1979; Babakus & Mangold, 1992). Shareef et al., 2011; Babakus & Mangold, (1992). Explain that it also decreases the respondent's frustration level as well as increases rate and quality of response. Again, the results of the pilot study demonstrated overwhelming empirical value of the scale.

4.5 Pilot Study

For the instruments credibility testing, and to make available room for adjustment, pilot study by means of five Liker-scale sample questionnaire were used. In the course of the exercise, fifty surveys have been distributed to some staff in the tertiary Institutions. More precisely, the survey have been distributed to some selected staff of the institutions and some expert from relevant field as a procedure to validate the instrument. After collected and used the data from the pilot study, Smart PLS version 3.0 has been used to get practicality on, discriminant validity, criterion validity and convergent validity, as illustrated in table 4, 13.

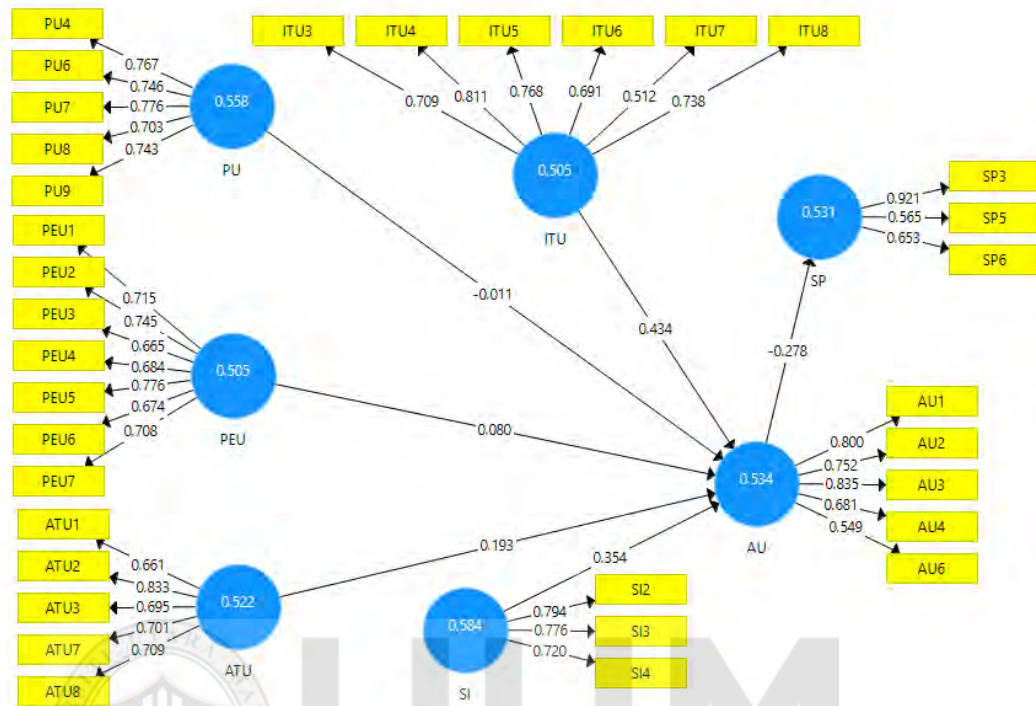


Figure. 4.3
showing the validity and Reliability the study constructs of pilot study

Table 4.13
Validity and Reliability of the Study Constructs

Variable	Cronbach's Alpha (α)	Composite Reliability	AVE
SP	0.656	0.765	0.531
PU	0.805	0.863	0.558
PEU	0.838	0.877	0.505
ITU	0.801	0.858	0.505
ATU	0.784	0.844	0.522
SI	0.654	0.808	0.584
AU	0.777	0.849	0.534

The pilot study results presented well suitable of the model with great composite validity, cronbach's alpha, as well as average variance extracted (AVE) of the constructs.

4.6 Questionnaire Administration

This study uses survey instrument through which the primary data collected at the selected offices were suggested as the best appropriate technique of conducting a survey. The research collected the data through travelling, distribution, and gathering of the questionnaires. More so, the services of a research assistant was recommended in the field of social science or humanities, with a minimum of a graduates' degree in order to fasten the process (Scheaffer et al., 1996). However, this study employed the service a research assistant in facilitating the data collection.

4.7 Qualitative Research design

This section highlights the step-by-step qualitative data collection procedure and interpretations. The processes include research design, participants' selection, face-to-face interview, validity and reliability, procedure of data analysis and possible ethical problem managing our behavior for qualitative investigation. In qualitative perspective, this section concentrated on interviews and to emphasize on the basis of the phenomenon that seek to explore, describe, elaborate and define the 'meaning' of a phenomenon under study.

4.7.1 Face-to-face Interviews

This study applied face-to-face interview technique and the views of the informants was used during the data analysis. Likewise, this technique has relative advantage, which permits the interviewer to explore the environment, the likelihood of having an extensive interview period. The period benefits the researcher of the chance to ask so many possible exploratory and complex questions that are needed extensively.

Moreover, the interview questions have been used for data collection. In this study data has been generated by means of semi-structured interviews. Semi structured-interviews will be used with individual manager. Moreover, for acquiring a reliable data, this study will use certain instruments comprises of electronic mail, video recorder and a tape recorder with respondents. But all these will be documented only with the permission of the interviewee (Lincoln & Guba, 1984).

4.7.1.1 Interview Questions

The following comprise of the interview questions:

- i. Could you mention the challenges confronting the ICT adoption in the tertiary institutions in Bauchi State?
- ii. What are the strategies required to improve ICT adoption in public service in Nigeria?

4.7.2 Selection of Participants

The method of participants' selection of this study has a straight link to the research objectives of the study, which targeted at exploring the factors and potential challenges confronting staff performance in ICT adoption in public tertiary institutions. Nonetheless, the researcher interviewed the management staff, during the data collection. This study has incorporated the broad numerical strength of the quantitative and the information of qualitative data to get comprehensive and complete picture of the ICT adoption as a device for staff performance. To facilitate the achievement of the stated objectives, the study uses different views of the staff such as management staff, middle class and computer unit staff.

Furthermore, the opinions of other staff comprising of senior staff, intermediary staff and ICT unit staff should be minimally sampled to increase understanding of the factors with potential challenges confronting staff performance in ICT adoption. These types of staff were selected in view of their stake in the institutions either as institutions policy formulators and implementers. By means of purposeful sampling technique, the researcher deliberately chooses the interviewees by the only purpose to make best use of information sources that facilitate full understanding of the phenomenon. Concerning the total number of the interviewees, a number of sample size is available for qualitative studies. Depending on the requests of the research, it is regularly argued that the greater number of cases the more unmanageable the study turns out to be and lead to a low understanding of the phenomenon. Inversely, the lower the cases studied, the greater understanding of the phenomenon (Creswell, 2012). According to Crouch

& McKenzie, (2006). Consider the fact that qualitative study concerns with the meaning of a social phenomenon, instead of generalization of hypotheses.

Table 4.14
Statistics of Qualitative Participants

Interviewee	Frequency	Percentage (%)
Senior Staff	2	16.7
Intermediate Staff	6	50
ICT Unit Staff	4	33.3
Total	12	100

4.8 Reliability and Validity

In this qualitative background, it is hard to accomplish total reliability and validity as can be easily gotten in quantitative technique, because the researcher must established interaction with the unit(s) to be studied containing dynamic procedures. Nevertheless, in the process of designing this qualitative research data validity and reliability and procedure should be considered the best by compliance with the recognized norms and ethics of the qualitative paradigm during the data collection, analyzing and reporting procedure. Therefore, as the basic objective of this study is to ensure understanding of the factors that militating staff rational decision to adopt ICT. The researcher should, therefore, report carefully and accurately the step by step the details of the entire processes and procedures truthfully and honestly.

4.9 Potential Ethnicity Issues

The researcher observed and assured the informants of the confidentiality of their views during the data collection. These guidelines of an ethical issue is one of the important part of the qualitative research. In the process of conducting the interview, the researcher observed the regular possible ethical issues as outlined by Sunder, Thornhill and Lewis (2009), and these include:

- i. Individual rights of privacy
- ii. Participant's right to withdraw at will
- iii. Earning consent and possible reception by the participants
- iv. Ways and manners to show while playing with the participants get the relevant data.
- v. Confidentiality of data and anonymity of the participants
- vi. Participants' effect of the way in which data is analyzed and report
- vii. Researchers' behaviour and objectivity.

4.10 Summary

This chapter comprises of the general research design that is built on convergent parallel methodological design. The chapter absorbed on the step by step process for sampling technique and sample size; instrumentation and data collection technique from the quantitative angle. On the other hand, qualitative research design discussed of participants' selection, interview reliability and validity. In conclusion, the chapter explains the potential ethical issues and at the end procedure for data analysis of mixed methods.

CHAPTER FIVE:

QUANTITATIVE DATA ANALYSIS

5.1 Introduction

The previous chapter of this study discussed the research design, the step-by-step process of data collection, the mixed methodological design, qualitative and quantitative research approaches to data collection and analysis. Likewise, this chapter presents the results of the analysis of the relationship between adoption of ICT and staff performance in the public tertiary institutions in Bauchi state, Nigeria. According to the data collection from the quantitative respondents and analysis conducted, this chapter presents the preparation and response level of the data from the field, analysis of the demographic part that displays the respondents' background information. Also discussed, about data screening and cleaning at the preliminary stage, in order to determine normality of the data. Hence, data characteristics, missing data, and factor analysis of the key variables. Furthermore, this chapter also reported the reliability and validity of the measurement. Likewise, PLS approach was used, and discussed the measurement model (Outer), structural model (Inner), and path relationship.

5.2 Data procedure and response rate

Considering the population of the study of 1,708 already explained in chapter four, and the minimum number of sample size agreed based on this population, according to the Dill man (2007) formulas, that determined the sample size of this research is 314. Moreover, in this study, the number was increased to 500, to avoid the sampling error cases, as well as non-responsive, as the viewed of Hair et al. (2010). In this case,

a number of 500 questionnaires were distributed among the non-teaching staff of the selected tertiary institutions from three senatorial zones of Bauchi, Nigeria, who operate computer system and other ICT facilities. The staff include: Senior non-teaching, intermediate staff and ICT staff. The majority of the respondents does not fill and returned the questionnaires instantly, but rather took them some days or weeks to respond. Nevertheless, in order to ensure a greater percentage of the Questionnaires distributed were filled and returned, the researcher in multiple times engaged in follow ups, reminder, calling numbers, going round, long time waiting, etc. All these efforts were made to ensure a reasonable number have filled and retrieved. Eventually, as a result of these tedious efforts, a reasonable percentage of 76.4 % have been achieved. The success came behind the letter of permission to data collection, received from GSGSG, University Utara Malaysia, which addressed direct to the respondents' various institutions, as well as the heads of departments and units in the various institutions that helped me in addressing the staff. The result was shown in table 5.1 below:

Table 5.1
The result of the Questionnaires distributed and returned.

Institution	Questionnaire Distributed	Questionnaire Returned	Percent (%)	Questionnaire Not-returned
ATBU (Southern Zone)	288	220	76	68
ATAP (Southern Zone)	67	51	76	16
CLIS (Central Zone)	45	35	78	10
SOHTECH (Central Zone)	4	4	100	00
BASUG (Northern Zone)	26	21	81	05
ASCOEA (Northern Zone)	70	51	73	19
TOTAL	500	382	76.4%	118

Table 5.1 shows that, out of the five hundred (500) questionnaires distributed among the non-teaching staff of the six tertiary institutions that partook in this study, the total of 382 questionnaires were filled and returned, which was about 76.4 % of the entire 500 copies distributed. The rate of this response reflected sufficient, in line with the view that any response rate of 50% and above is considered adequate (Creswell, 2012). Moreover, 118 questionnaires were not returned. The survey period took about three months, started in August, 2017 and ends in October, 2017, respectively.

The table indicated that ATBU, the federal university in the southern zone of Bauchi received 288 questionnaires, based on the proposed proportionate questionnaires distribution shows in table 4.3, filled in and returned 220, only 68 were not returned due to the nature of their duty scheduled and some staff were followed up severally, but unfortunately they were not found. In ATAP also 67 questionnaires were distributed and 51 were able to returned and 16 not returned, because the researcher have been visiting their offices, makes phone calls, text messages yet, the research could not trace where he could find them. So also, CLIS the college for legal, 45 questionnaires were distributed and retrieved 35, only 10 questionnaire were not able to retrieve. Yet again, SOH&TECH, only 4 questionnaires were distributed and all were returned. BASUG also 26 questionnaires distributed, and 21 were returned, only 5 were not retrieved, and ASCOEA were 70 questionnaires distributed and 51 were returned completed, only 19 were not returned due to their tired scheduled in office and some staff were away, for official assignments and other were half way completed and excluded from the analysis, as recommended by Hair et al. (2010).

Nevertheless, due to outlier issue, 66 responses were excluded from the analysis. Therefore, the number of the questionnaires dropped to 316, which the percentage also decreased to 63.2%. Nonetheless, Creswell, (2012) has the view that any response rate of 50% and above is considered adequate, as well as Sekaran (2003) that has the view that 30% of survey respondents is acceptable. So in this case 63.2% is adequate enough to certify the survey to be used for analysis. Yet again, in regression analysis, the survey percentage is adequate since been around 5 to 10 times the number of variables of this study, (Sekaren & Bougie, 2013. Whereas, the distributed and response rate of questionnaires, analysis is shown below in Table 5. 11.

Table 5.2
Analysis of Distributed Questionnaires distributed and response rates.

Item	Frequency	Percent (%)
Distributed questionnaires	500	100
Returned questionnaires	382	76.4
Rejected questionnaires	118	23.6
Excluded questionnaires (outliers)	66	17.3
Total usable	316	82.7

5.2.1 Study Sample Description

This section presented the demographic information of the respondents thus, age, gender, working experience, level of education, previous experience, present experience, Administrative position, and ICT experience were presented.

5.2.2 Demographic Characteristics of the Respondents

This section presents the demographic characteristics of the respondents of this study. Thus, the gender, marital status, age, experience in service, administrative position, academic field, and ICT experience were presented below:

5.2.3 Gender of the respondents

In table 5.3, the distribution of the gender was presented with frequency 278, percent, 88.0 male, and frequency 38, percent 12 female. This signifies that this study has collected the opinion of both gender groups, with male non-teaching staff as the dominant respondents.

Table 5.3
Gender

Gender	Frequency	Percentage (%)	Cumulative Percentage
Male	278	88	88
Female	38	12	12
Total	316	100	100

5.2.4 Marital status of the respondents

The table 5.4 below, explained the marital status with frequency 33, percent, 10.4 single, frequency 281, percent, 88.9 married, and frequency 2, percent 0.6 were widows. This indicated that, the opinion of the various marital status and the respondents' distribution captures the married non-teaching staff were the majority respondents in this study.

Table 5.4

Marital status

Status	Frequency	Percentage (%)	Cumulative Percentage
Single	33	10.4	10.4
Married	281	88.9	99.4
Widow	2	0.6	100
Total	316	100	

5.2.5 Age of the respondents

The age distribution of the respondents as indicated in table 5.5 below shows that non-teaching staff within the ages 18-25 were frequency 7 and percent 2.2. Those within the age range of 25-30 were frequency 39 and percent 12.3. Again, the respondents within the age range of 30-35 were frequency 56 and percent 17.7. Similarly, the non-teaching staff within the age range of 35-40 years were frequency 88; percent 27.8. Whereas, the respondents within the age range of 40-50 years were frequency 98 and percent 31.0. The study shows that those within the ages of 50 years and above were frequency 28 and percent 8.9, respectively.

Table 5.5

Age

Age	Frequency	Percentage (%)	Cumulative Percentage
18 – 25yrs	7	2.2	2.2
25 – 30yrs	39	12.3	14.6
30 - 35yrs	56	17.7	32.3
35 – 40yrs	88	27.8	60.1
40 – 50yrs	98	31.0	91.1
50yrs – above	28	8.9	100.0
Total	316	100	

5.2.6 Educational Qualifications of the Respondents

The educational qualifications of the respondents in table 5.6, displays the frequency 102 and percent 32.3 of the non-teaching staff were Diploma/NCE certificate holders. Then frequency 164, percent 51.9 of the respondents were those with B. Sc. Certificates. It also indicated that staff with M. Sc. Qualifications were frequency 43, percent 13.6 and frequency 7, percent 2.2 of the staff were those who obtained Ph. D respectively.

Table 5.6
Educational Qualification

Qualification	Frequency	Percentage (%)	Cumulative Percentage
Diploma/NCE	102	32.3	32.3
B. Sc. /HND	164	51.9	84.2
M, Sc.	43	13.6	97.8
Ph. D	7	2.2	100
Total	316	100	

5.2.7 Previous working place of the Respondents

The study also captures the previous working places of the respondents in order to identify those who work in other places of work before this study area. Some of the respondents among the non-teaching staff were previously working elsewhere before they were transferred to the present working place. Therefore, table 5.7 shows that those with less than one 1 year previous working experience were frequency 14, percent 4.4. Again, those staff with previous working experience for a period of more than 1 year but less than 3 years have frequency 35, percentage 11.1. Yet again, frequency 38 and 12 percent of the staff were more than three years but less than 5 years. Moreover, the staff that have more than 5 years but less than 10 years'

experience were frequency 24, percent 7.6 percent. Similarly, the results show that frequency 73, percent 23.1 of the respondents were those with more than 10 years respectively. Therefore, the respondents who did not have previous working experience were frequency 132 and 41.8 percent respectively.

Table 5.7
Previous Working Experience

Period	Frequency	Percentage (%)	Cumulative Percentage
Less than 1 yr	14	7.6	7.6
More than 1yr and less than 3yrs	35	19.0	26.6
More than 3yrs and less than 5 yrs	38	20.7	47.3
More than 5yrs and less than 10yrs	24	13.0	60.3
More than 10yrs	73	39.7	100.0
Total	184	58.2	
None	132	41.8	
Total	316	100	

5.2.8 Present Working Experience of the Respondents

The results showed that present working experience of the respondents as reflected in table 5.8, displays the frequency 18 and percent 5.7 have less than 1-year experience. Again, the results showed frequency 28 and percentage 8.9 staff have the experience of more than 1 year but less than 3 years. More so, the staff with more than three years but less than 5 years' experience were frequency 99 and percentage 31.3. So also, the staff that were with more than 5 years but less than 10 years were frequency 71, percentage 22.5, and frequency 100, percentage 31.6 of the staff who have more than 10 years working experience. This specified that the staff that have more than 10 years

working experience were the dominants respondents, with about 31.6 % of the total sample size.

Table 5.8
Present Working Experience

Experience	Frequency	Percentage (%)	Cumulative Percentage
Less than 1 yr	18	5.7	5.7
More than 1 yr and less than 3yrs	28	8.9	14.6
More than 3yrs and less than 5 yrs	99	31.3	45.9
More than 5yrs and less than 10yrs	71	22.5	68.4
More than 10yrs	100	31.6	100.0
Total	316	100.0	

5.2.9 Administrative positions

The administrative positions of the respondents in table 5.9 below shows that the non-academic staff have frequency 4, percent 2.4 of them were occupying the position of the Registrar. Therefore, frequency 6, percent 3.7 was holding the position of the Bursar. Again, frequency 4, percent 2.4 of the respondents were holding an administrative position of the chief librarian in the study area. Whereas, the staff that were holding the position of Director of works were frequency 2, percentage 1.2. The position of the Director of medical unit shows frequency 4, percent 2.4. Moreover, the number of staff occupying the position of Director, ICT unit, as shown in the results was frequency 7, percent 4.3. Similarly, the administrative officers in the registry consist of frequency 109 and percent 66.5.

Consequently, the results showed frequency 28, percent 17.1, were the staff occupying the position of the clerical officers. The results also showed that frequency

109 and percent 66.5 of the respondents were not occupying the position of administrative officer. This implies that the staff that were holding the position of administrative officer were the dominants respondents in all the positions.

Table 5.9
Administrative Position

Administrative Rank	Frequency	Valid percentage (%)	Cumulative Percentage
Registrar	4	2.4	2.4
Bursar	6	3.7	6.1
Chief Librarian	4	2.4	8.5
Director of Works	2	1.2	9.8
Director of Medical	4	2.4	12.2
Director ICT Unit	7	4.3	16.5
Admin Officer	109	66.5	82.9
Clerical officer	28	17.1	100
Total	164	51.9	
None	152	48.1	
Total	316	100	

5.2.10 Area of Specializations of the Respondents

The results captured the various academic disciplines of the respondents for instance, social sciences, medical and health, natural sciences as well as applied. Regards to the academic field, table 5.10 displays that frequency 249 and percent 79.0 were trained in the field of social and management sciences. Then frequency 14, percent 4.4 were from the field of natural sciences. So also, the staff with applied science expertise were frequency 40, percent 12.7, and those from the medical and health sciences were frequency 12, percent 3.8, respectively.

Table 5.10
Academic Field

Field	Frequency	Percentage (%)	Cumulative Percentage
Social & Management Sciences	249	79.0	79
Natural Science	14	4.4	83.5
Applied Science	40	12.7	96.2
Medical & Health Science	12	3.8	100
Total	315	99.7	100
None	1	0.3	
Total	316	100	

5.2.11 ICT experience

Table 5.11 portrays that the non-academic staff that have less than one year experience in information and communication technology were frequency 22, percent 7.0. Whereas, those that have 1 year to 3 years' experience were frequency 50, percent 15.8. More so, frequency 64, percent 20.3 staff were with the experiences of 3 to 4 years, respectively. Meanwhile, the staff with more than 5 years' experiences were frequency 179, percent 56.6, and frequency 1 and percent 0.3 staff has no ICT experience respectively.

Table 5.11
ICT experience

Experience	Frequency	Percentage (%)	Cumulative Percentage
Less than 1yr	22	7.0	7.0
1yr - 3yrs	50	15.8	22.8
3yrs - 5yrs	64	20.3	43.0
More than 5yrs	179	56.6	99.7
Not use at all	1	0.3	100
Total	316	100	

5.3 Data inspection and screening

Inspection and screening of data are very essential in the process of conducting multivariate analysis. Pallant (2013), has the view that for any research outcome to be excellent, initially depends upon its original data quality. The data for this study were inspected and screened properly in line with the procedures and techniques recommended by Coakes and Ong (2011), pallant (2013). Thus: the following procedures were used to reach the target by using a clean data in this study. Includes, unengaged responses, dealing with missing values, assessment of outliers, and normality test.

5.3.1 Unengaged Responses

Unengaged response happens when throughout a set of questions, a respondent chooses the same answer provided. It can be resulted through standard deviation examination of every respondent in the Microsoft excel sheet. Roni, (2014) has the view that the type of responses that the respondent answer without giving attention to the questions, such type of responses has no importance to the analysis and should be excluded from the set of data. Furthermore, it has been recommended that in a five-point Likert scales, any of the respondent scores below 0.500 should be excluded from the data set (Gaskin, 2012). Therefore, in this study the standard deviation of 0.500 points and above had been achieved by all respondents. This signifies that the dataset is now appropriate and no single case of unengaged response.

5.3.2 Missing Values

Missing value refers to a situation where the respondent usually answers some questions and left others unanswered in the survey questionnaire, intentionally or unintentionally, which usually causes a blank or unanswered column. Therefore, depending on the number of the missing data, the missing column that not attended by the respondent has to be deleted or refilled, (Hair et al., 2010; Gaskin, 2012; Hair, Ringle, & Sarstedt, 2014). Moreover, missing values have negative consequence, particularly on quantitative approaches. It usually led to the weakening generality of study results, increases standard error, and bias estimates, (Dong & Peng, 2013).

So, in this study, the researcher undertook a process of recognizing the missing value and replaced, after a return from data collection. The researcher coded the variables in the questionnaire and imported the data set into the SPSS datasheet. Then uses the SPSS in checking the dataset through the descriptive statistics. This helps the researcher in determining the existence, as well as the number of the missing values appeared in the data sheet. Therefore, the missing values of the Likert scale that were found randomly spread in the data environment were 3 (0.95%). The cases include ATU 4, AU 1, and SP 2. Following the view explains that, less than 1% missing data considered are rated unimportant and from 1 to 5% considered manageable, if they are randomly dispersed, do not stance a data risk (Tabachnick & Fidell, 2013). Precisely, for the missing values, attitude toward use, social influence and actual use were recorded with 1 missing value each. Nonetheless, mean substitutions should be applied to replace missing values in SPSS as recommended by some literatures (Kline, 2015).

Henceforth, this study has uses mean substitution method and replaced all random missing values, as showing in table 5.12.

Table 5.12
Summary of missing values

Variable	Number of Missing Item
Attitude Towards Use (ATU 4)	1
Staff Performance (SP 2)	1
Actual Use (AU 1)	1
Total	3

5.3.3 Assessment of Outliers

In a survey study, it usually happened to see that, in a particular set of data some few cases were found differently not significant with one another. In statistical analysis these circumstances referred to as outliers, (Byrne, 2010). The outlier is a case that happened with a peculiar amalgamation of variable scores that changes the statistical estimate. More so, there are two major outliers; univariate outlier, is the outlier that effects a single case, while multivariate are the outliers that have effect on two or more variables, (Tabachnick & Fidell, 2013). Moreover, both the multivariate and univariate outliers are all to be identified and removed from the data set, (Hair et al., 2010).

Yet again, frequency analysis was used to screen the data for all items in the questionnaire of this study, to check for the minimum and maximum values to identify out of range values. The results signifies that all the values were in the range of (1-5), that is meant that there were no coding error and univariate outliers were identified and deleted. Therefore, univariate outliers normally detects through z score values and

± 3.29 (0.001 sig. level) is the necessary for all the observations to fall in (Tabachnick & Fidell, 2007). Thus, this study has detected and deleted the total of 66 univariate outliers that has the observations more than ± 3.29 .

Tabachnick & Fidell, (2007), suggested that the degree of freedom is equivalent to the total of its independent variables used in that specific study. Moreover, for the number of independent variable of this study, the degree of freedom resulted 7, as well as the degree of freedom of $P > 0.001$ on the chi-square is 15.09. Therefore, outliers are also when observation with Mahalonobis distance greater than ± 3.29 (0.001 sig. level) on the chi-square is 15.09. In this study, the following were the number of cases found and deleted as outliers where observation with Mahalonobis distance greater than ± 3.29 (0.001 sig. level) and chi-square of 15.09. Thus: (66) Nonetheless, on more multivariate analysis, investigation using cock's distance should be done to discover the degree of likely effects (Hair et al., 2010). Moreover, scholars like Cook and Weisberg (1982), recommended that every cock's distance case with less than 1.0 values must not be regarded as an effective outlier, in fact it could be kept and be used for further analysis. The results of cock's distance conducted, portrays in table 5.13 that all the outliers were not influential.

Table 5.13

Multivariate Outliers with observations more than (± 3.29 , i.e., 0.001 sig. level)

Constructs	Frequency	Percent (%)
Staff Performance (SP)	20	5.2
Actual Use (AU)	4	1.1
Perceived Usefulness (PU)	11	2.9
Perceived Ease of Use (PEU)	4	1.1
Intention to Use (ITU)	6	1.6
Attitude Toward Use (ATU)	14	3.7
Social Influence (SI)	7	1.8
Total	66	17.4 %

Furthermore, in a particular study, if the number of outliers is not significant considering the total observations, it has been argued that such outlier was not influential, then it should be retained. Since the number of the multivariate outliers identified with less value was only sixty six, (17.4 %), then, these shows that the cases were to be retained (Cohen, Cohen, West, & Aiken, 2003). Eventually, all the 316 cases were qualified to be retained for further multivariate analysis.

5.4 PLS Path Modelling Justification

PLS-SEM (Partial least Square Structural Equation Modelling) is becoming more widespread and acceptable multivariate technique of analysis in several disciplines, (Lohmoller, 1989). Lee, Petter, Robinson and Fayard (2011), explains that in recent time PLS-SEM is gaining acceptance in the field of accounting to be used in data analysis in the field. More so, it has progressively attainment acceptability in the field of information system management and international marketing (Ringle, Sarstedt, &

Straub, 2012; Henseler, Ringle, & Sinkovics, 2009). Moreover, PLS-SEM has the greatest flexibility in modelling's difficulties handling in various capacities (Hair, Ringle, & Sarstedt, 2013). These signify the relevance of the PLS-SEM to the major constructs of this study. In view of these, this study has chosen for the use of PLS-SEM to begin factor analysis of the measurement model (outer) and structural modelling (inner) (Hair, Ringle, & Sarstedt, 2013). Actually, these are the reasons this study used SmartPLS 3.0 for its analysis.

5.5 Confirmatory Factor Analysis

As all the measurement items of the variables of this study were adapted from proceeding studies, there is no needs for the exploratory data analysis of this study (Hair et al., 2010). Confirmatory factor analysis for this study was conducted using the PLS algorithm in Smart PLS 3.0. The outcomes of the major component analysis for all the 52 items for the 7 constructs resulted that twenty (20) items were deleted and left this study with 32 items, due to the issues of cross loading of the constructs and the average variance extracted (AVE), calculated by means of a PLS algorithm as shows in Table 5. 14

Table 5.14

Cross Loadings of the Study Variables

	ATU	AU	ITU	PEO	PU	SI	SP
ATU1	0.728	-0.030	0.268	0.157	0.067	0.212	0.204
ATU2	0.786	0.031	0.252	0.072	0.039	0.237	0.255
ATU3	0.653	0.028	0.206	0.048	0.005	0.268	0.213
AU1	0.041	0.535	-0.050	-0.054	0.382	0.042	0.100
AU2	0.001	0.679	0.041	-0.055	0.549	0.066	0.063
AU3	0.004	0.852	0.063	-0.108	0.753	0.179	0.027
AU4	0.020	0.816	0.085	-0.089	0.820	0.131	0.054
AU5	0.015	0.839	0.057	-0.152	0.848	0.102	0.041
AU6	0.000	0.670	-0.051	-0.066	0.523	0.135	0.041
ITU2	0.339	0.065	0.690	0.131	0.076	0.374	0.214
ITU3	0.258	-0.017	0.781	0.204	0.026	0.348	0.198
ITU4	0.201	0.020	0.745	0.060	0.048	0.322	0.163
ITU5	0.183	0.064	0.731	0.169	0.108	0.341	0.170
ITU6	0.179	0.040	0.696	0.130	0.062	0.300	0.174
ITU8	0.254	0.029	0.691	0.081	0.040	0.364	0.180
PEU7	0.077	-0.140	0.120	0.878	0.153	0.108	0.166
PEU8	0.132	-0.037	0.181	0.664	0.062	0.240	0.140
PU6	0.044	0.774	0.141	-0.111	0.858	0.162	0.046
PU7	-0.040	0.801	0.016	-0.184	0.881	0.054	-0.197
PU8	-0.010	0.787	0.059	-0.096	0.850	0.093	-0.151
PU9	-0.035	0.105	0.048	0.028	0.204	0.009	-0.144
SI3	0.250	0.026	0.400	0.175	0.050	0.570	0.177
SI4	0.243	0.135	0.347	0.137	0.109	0.722	0.234
SI5	0.214	0.111	0.278	0.155	0.070	0.772	0.277
SI6	0.215	0.135	0.312	0.144	0.109	0.750	0.199
SI7	0.269	0.117	0.404	0.124	0.074	0.740	0.253
SP1	0.280	0.035	0.218	0.209	0.132	0.293	0.838
SP2	0.291	0.036	0.193	0.170	-0.145	0.215	0.850
SP3	0.278	0.080	0.231	0.114	0.065	0.291	0.771
SP4	0.174	0.066	0.188	0.122	0.095	0.218	0.828
SP5	0.206	0.084	0.247	0.161	0.067	0.302	0.794
SP6	0.262	0.015	0.151	0.158	0.104	0.240	0.720

Table 5.14 shows the cross loading scores of the items of the study variables. The items' results of the scores for each of the items have great correlation between themselves.

The scores bolded are items of cross loadings entirely for every single variable. The results of each item of the variable scores reveal high correlation, whereas inter-correlations was disapproved among the constructs. This refers to as, item loadings, high score within themselves relates to other items assessing one more variable showed the item's applicability and fattiness in assessing the constructs they supposed to assess. If the constructs met with the measurements, basic prerequisites; therefore, all the items are retained and utilizes for further analysis of this study. Therefore, Conformity factor analysis likewise delivered correlation matrix among the factors and the overall scores as required to get the variable validity of the measuring scale.

5.5.1 Construct Validity

Construct validity's measurement, is used through the procedures of multivariate of confirmatory factor analysis, as well as correlation matrix, whereas, construct validity component such as convergent validity, discriminant validity and criterion validity (Zikmund et al., 2009). The Item "I use the correct terminology with the computer in my office work. With M=4.54" has the highest score. If the item indicators of the constructs have high outer loadings it is a signal of link in measuring the constructs (Hair, Hult, Ringle, & Sarstedt, 2014). Moreover, for establishing construct convergent validity, the AVE statistical technique has to be used, and the main

prerequisite for convergent validity is achieved as the indicator of entire items are significant statistically with > 0.708 standardized outer loadings. In this regards, this portrays that the dominant constructs described minimum of 50% of the indicator variance (Hair, Hult, Ringle, & Sarstedt, 2014). Thus the accompanying validity and values of reliability were depicted by having the measurement loadings estimated.

Table 5.15
Validity and Reliability of the Study Constructs

Var.	AVE	Composite Reliability	Cronbach's Alpha (α)
SP	0.642	0.915	0.888
PU	0.569	0.819	0.705
PEU	0.606	0.751	0.368
ITU	0.523	0.868	0.817
ATU	0.525	0.767	0.546
SI	0.510	0.838	0.759
AU	0.549	0.877	0.831

Going by the Table 5.15 that shows the scores of all the study constructs obtained in AVE. It has been observed that all the AVE scores have the value of > 0.5 , this goes with the opinion that has the viewed of ≥ 0.50 scores of AVE are considered acceptable (Anderson & Gerbing 1988; Shook, Ketchen, Hult & Kacmar, 2004).

5.5.2 Discriminant Validity

According to Hair, Hult, Ringle, and Sarstedt (2014), creating discriminant validity in a model is all about the exceptionality of a particular construct to stand in place and explains a given phenomenon that does not appear in the other construct in the same model. More so, there are the views suggested as a rule of thumb that discriminant validity correlation should not be more than 0.75 (Zikmund et al., 2009). So, the square

root of the value of the average variance extracted (AVE) with correlations of the latent variable was used to establish discriminant validity using Fornell-Larcker criterion. In this case, it observes that as the square roots of the AVE of all the constructs were more than the highest correlation of the other constructs, signifies that all the constructs have met the requirement. Consequently, we declare that the latent variables of this study have common variance with their corresponding allocated indicators as showed in Table 5.16.

Table 5.16
Discriminant Validity

	ATU	AU	ITU	PEO	PU	SI	SP
ATU	0.725						
AU	0.016	0.741					
ITU	0.333	0.048	0.723				
PEO	0.124	-0.125	0.181	0.779			
PU	-0.005	-0.903	0.083	-0.148	0.754		
SI	0.329	0.153	0.476	0.201	0.116	0.714	
SP	0.311	0.066	0.256	0.196	-0.128	0.324	0.801

Table 5.16 portrays the scores of the latent variables and as discriminant validity proof. Normally, Strong discriminant validity was recognized within the satisfactory ranged of $\geq .70$, as well as appropriate indices of ≥ 0.90 (Shook, et al., 2004).

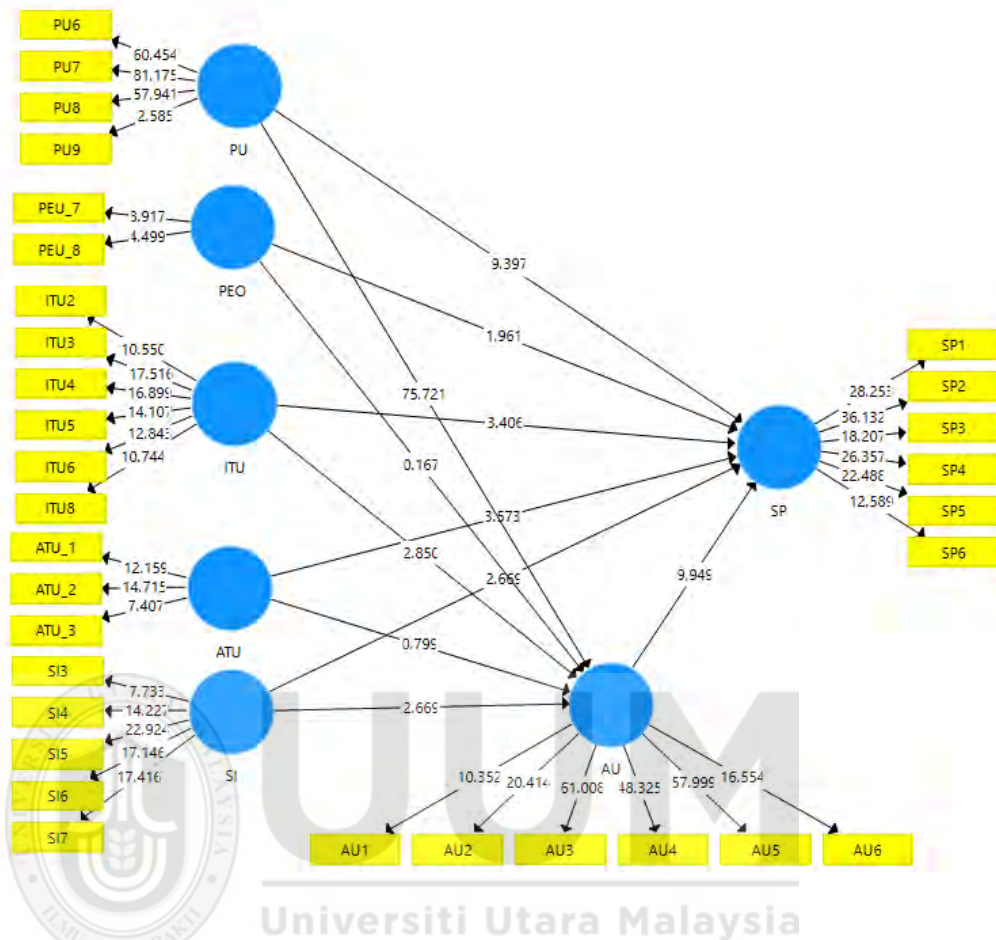


Figure 5.1
PLS structural model

Discriminant validity can freely be assessed through the cross loading. It has to do with loading of individual indicator. Therefore, constructs discriminant validity is when a cross loading is greater than indicator out loadings. In Table 5.16 the bold scores are the scores of the variables of related indicators were larger than the cross loadings available (Hair, Hult, Ringle, & Sarstedt, 2014).

5.5.3 Internal Consistency Reliability

According to Larsson (2015), internal consistency reliability proof on the data produced from any of the tools of this study. Moreover, factor analysis has obtained the construct validity with varimax rotation in order to make best use of the variance clarified and for ease of explanation. So also, as varimax rotation been calculated that was where the study construct validity was achieved.

Moreover, the measurement consistency refers to as reliability. It is all about measurement capability and strength to provide reliable outcomes at a particular period of time, under diverse situations and likely dissimilar samples. The commonly used approaches of assessing reliability are three, consists of internal consistency, test re-test, as well as alternative form (Mitchell, 1996).

Test re-test is one of the technique of reliability that usually attained as a result of correlating two data that collected using items from the same questionnaire under the same circumstances. Therefore, the questionnaires in this case were required to administer twice to the respondents. More so, the small sample was used for pilot study using the same measurement items, almost with the range closely with the actual survey exercise. The results of the statistical analysis of the pilot test of all the measurement items have the highest reliability.

Nevertheless, Cronbach's Alpha (α), is the statistical techniques that are usually used for internal consistency calculations. Therefore, Hair, Hult, Ringle, and Sarstedt,

(2016), have the view that, as compared to Cronbach's (α), composite reliability is more suitable measures to create internal consistency reliability, in PLS-SEM algorithm.

The PLS estimated latent variables, reliability assessment, the Cronbach's (α) and the composite reliability were calculated as shows in Table 1.15. The range of the results of composite reliability shows the results of the entire constructs have greater than ≥ 0.70 , which is the minimum required. Likewise, the latent constructs' correlation scores showed the required reliability. This shows that there is consistent with the literature (Hair, Hult, Ringle, & Sarstedt, 2014; Bonett & Wright, 2015).

5.5.4 Inner (Structural Model)

Albaers, (2010), has the views that, one of the common standards for measurement of value and significance of the structural model is a direct relationship. However, the inner model can likewise be observed by the total of direct and the indirect effects. Particularly, if a study discovers the different effects of the mediating variable in dissimilar driver variables on a criterion construct. The hypothesis testing results of this study were acquired, through partial least square path multiple regression. Therefore, the results of both direct and indirect effects, were presented. In addition, the mediating effects were also calculated using the partial least square bootstrapping output. Tibshirani, 1993) using 5000 resamples (Hair, Hult, Ringle, & Sarstedt, 2014; Hayes, 2009).

5.5.5 Main Effect

It should be noted that all the major constructs of this study stand none-dimensional, but there were some items deleting due to the calculations of average variance extracted (AVE), out of the 9 PU items, (PU1- PU5) were deleted; out of 8 PEU, (PEU1- PEU6) were also deleted; But in ITU and SI, only two items were deleted, (ITU1 & ITU7) and (SI1 & SI2) were deleted respectively. Whereas, (ATU4 – ATU8) were also deleted. However, only the items of the AU and SP constructs were remained unchanged. For these reasons, these variables were taken as hypothesized originally.

Nevertheless, Hair, Ringle and Sarstedt (2013); and Darlington, and Hayes (2016), explain that the X on Y direct effects marks clarification and comprehending of mediating analysis stress-free. More so, the relationship of the direct effects among the hypothesized relationship established for this study, henceforth, the analysis of the direct effect results is likewise presented.

5.5.5.1 Restatement of Main Effect Hypotheses

In accordance with the developed model of this study, the concentration here was on validating and testing the main effect hypotheses. Therefore, the five main effects comprising seven variables have been hypothesized in line with research question one. Particularly, the five exogenous variables were hypothesized to partake the direct effect on endogenous one. Moreover, the exogenous variables are perceived usefulness (PU), perceived ease of use (PEU), intention to use (ITU), attitude toward

use (ATU) and Social influence (SI). While staff performance is the endogenous variable. However, the hypothesis relating to the direct effect in preparation for testing the effects re-stated below in line with research question one.

- H¹ There is a positive relationship between the perceived usefulness (PU) and staff performance.
- H² There is a positive relationship between perceived ease of use (PEOU) and staff performance.
- H³ There is a positive relationship between intention to use and staff performance
- H⁴ There is a positive relationship between attitude toward use and staff performance.
- H⁵ There is a positive relationship between social influence (SI) and staff performance
- H⁶ There is a positive relationship between actual use and staff performance.

5.5.5.2 Results of the Main Effect Hypotheses

In line with this study's research question number one and the developed hypotheses' relationship that explains in this section, the results of five independent variables on the dependent variable, staff performance. To measure the variables interactive effect, a procedure of bootstrap resampling was accomplished by means of 5000 resamples (Hair, Hult, Ringle, & Sarstedt, 2013; Hayes, 2009). The deliberation of the variables'

direct effect, especially the contributions of each independent variable is characterized by the values of the standard beta in the structural model in PLS (Chin, 1998b). In the relationship of the structural model testing the significant level choice was set at $p < 0.5$ and $p < 0.01$ (Hair et al. 2010).

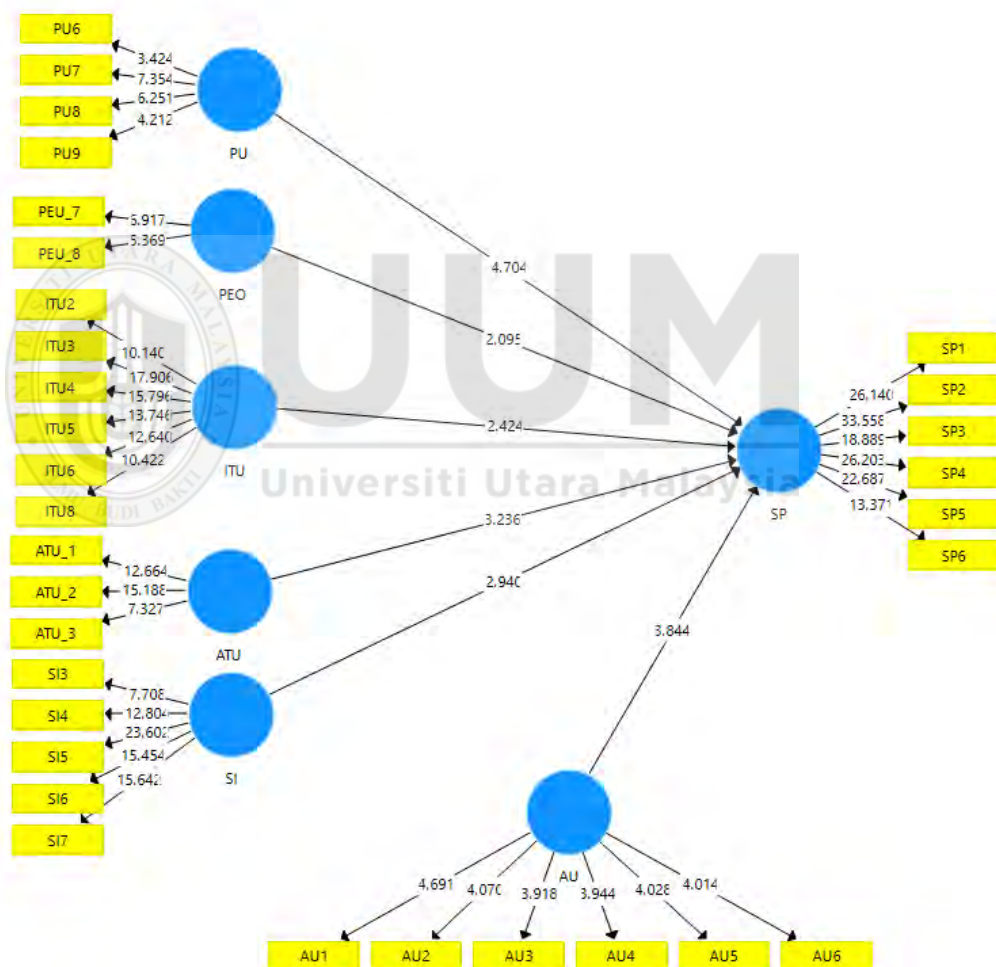


Figure 5.2
Model of main effect bootstrap

The above figure 5.2 shows the graphical demonstrations of the bootstrap explaining t-values and path coefficient β (standardized) for the relationship of the hypotheses' statements. Therefore, as shown in the figure 5.2, it has been indicated that, the results of the bootstrap, all of the six direct relationships reveal significant positive relationships.

Table 5.17

Results of Main Effect between Dependents and Independent Variables

H0	Relations	Beta (β)	STD. Error	t-value	p-value	R ²	f ²	Decision
H1	PU -> SP	-0. 571**	0. 121	4.70	0. 00	0.3	0.26	Supported
H2	PEU -> SP	0. 098*	0. 047	2.10	0. 02		0.28	Supported
H3	ITU -> SP	0. 117*	0. 048	2.42	0. 01		0.01	Supported
H4	ATU -> SP	0. 165**	0. 051	3.24	0. 00		0.02	Supported
H5	SI -> SP	0. 165**	0. 056	2.94	0. 00		0.04	Supported
H6	AU -> SP	0. 470**	0. 122	3.84	0. 00		0.02	Supported

** indicates significance level at $p < 0.01$

* indicates significance level at $p < 0.05$

In the same way, Table 5.17 explains the hypothesized relationships between the independent variables and the dependents variable, by portraying the statistical results of the standardized path-coefficient (β), standard error, as well as the p-value. According to Chin (2003); Thelwal, Haustein, Lariviere, and Sugimoto (2013), in any related social science research, the level of significance of ($p < 0.01$) or ($p < 0.05$) is normally the requirement for the direct effect, total effect, as well as a statistical test for reliable results in statistical measurement. Particularly in this study, all of the six paths confirmed strongly significance effects H1, H4, H5 and H6 at (0.00), H3 at (0.01) and H2 at (0.02) levels respectively. Therefore, these results show that all the independent variables have strong significant support on the dependent variable. Only

the H1 relationship shows negative, but has strong significant effect at (0.00). The results revealed that the more a non-teaching staff perceived usefulness (PU) of the information and communication technology's facilities, the greater the rise of his/her performance ($\beta = 0.571$; $t = 4.70$, $p < 0.00$). This refers to as the non-teaching staff performance is positively influenced by his or her perception of the usefulness of the information and communication technology's facilities. Therefore, the result supports the H1, which states that the perceived usefulness of ICT facilities significantly influences staff performance.

Furthermore, the results proved strong significance positive influence of perceived ease of use (PEU) of information and communication technology facilities on non-teaching staff performance ($\beta = 0.098$; $t = 2.10$, $p < 0.02$). Consequently, this indicates that the more a staff perceives ease of using ICT facilities, the greater influences his performance. Thus, certifies hypothesis H2, which tentatively states that perceived ease of use (PEU) positively influences staff performance.

Likewise, the results demonstrated statement of the hypothesis (H3), which projected positive influence of intention to use office technology on staff performance. The results described that the more increase in staff intention to use office technology facilities increases his/her performance ($\beta = 0.117$; $t = 2.42$, $p < 0.01$).

More so, the results of the hypothesis (H4) which shows that attitudes toward use (ATU) of the office technology facilities, positively influences staff performance ($\beta =$

0.165; $t = 3.24$, $p < 0.00$). This refers to as the non-teaching staff performance is positively influenced by his/her attitudes toward use of the information and communication technology facilities. Therefore, the result supports the H4, which states that the attitude toward use of ICT facilities positively influence staff performance.

Similarly, clearly parades in the results that social influence of the use of ICT facilities, positively influences staff performance. In this regards, social influence of the use of technological tools, influences staff performance. This results established hypotheses (H5) which tentatively states that social influence (SI) positively influences staff performance ($\beta = 0.165$; $t = 2.94$, $p < 0.00$)

Yet, in line with hypotheses (H6), illustrated in the results that actual use (AU) of the information and communication technology (ICT) facilities, is positively connected to staff performance ($\beta = 0.470$; $t = 3.80$, $p < 0.00$). This means that the more staff are using office technology, the more influences his/her performance.

5.6 Mediation effect

The analysis of the mediating (indirect) effects of actual use (AU) of ICT facilities, between the independent variable and the dependent variables has been presented in this section. In mediation effect, we have embarked on absolute understanding of a certain phenomenon by responding to “how” and “when” ICT facilities influences staff performance, and inversely “when” they do not. Hence, the question of “how”

get the applicability, cognitive as well as the psychological traits that causally links technological attributes, and staff performance, while the question of “when” concerns with the boundary of the causal associations. Therefore, this proposition brings actual use of the information and communication technology (ICT) facilities.

5.6.1 Restatement of mediating Effects’ Hypotheses

This study deals with measuring the mediating effect of actual use in the relationship between five (5) independents variables, perceived usefulness, perceived ease of use, intention to use, attitudes towards use, social influence, and dependent variable, staff performance. Thus hypothesized accordingly:

- H⁷ Actual use of office technology (AU) mediates the relationship between the perceived usefulness (PU) and staff performance (SP).
- H⁸ Actual use of office technology (AU) mediates the relationship between the perceived ease of use (PEU) and staff performance (SP).
- H⁹ Actual use of office technology (AU) mediates the relationship between attitude toward use (ATTU) and staff performance (SP).
- H¹⁰ Actual use of office technology (AU) mediates the relationship between intention to use (ITU) and staff performance (SP).
- H¹¹ Actual use of office technology (AU) mediates the relationship between Social Influence (SI) and staff performance (SP).

5.6.2 Results of Mediating Effect

In this section, mediating analysis was conducted, therefore, there were views that emphasis on the significance of reporting the sum of the direct and indirect effects between the two constructs. This is to show the clear picture of the mediating variable, as well as the cause-effects relationships (Vinzi, 2013; Jose, 2013; Wamba, Gunasekaran, Akter, Dubey & Childe, 2017).

Consequently, the criteria this study followed to assess both the mediating effects of actual use of ICT facilities as well as the strength of the relationship between five (5) independents variables, perceived usefulness, perceived ease of use, intention to use, attitudes towards use, social influence, and dependent variable, staff performance became in line with the views of Jose (2013) and Pu, Hou, & Ma (2017).

As specified in the preceding section, here, this study presents PLS bootstrap results concerning the mediating effects of actual use of ICT facilities in the relationship between perceived usefulness, perceived ease of use, intention to use, attitudes towards use, and social influence; and dependent variable, staff performance

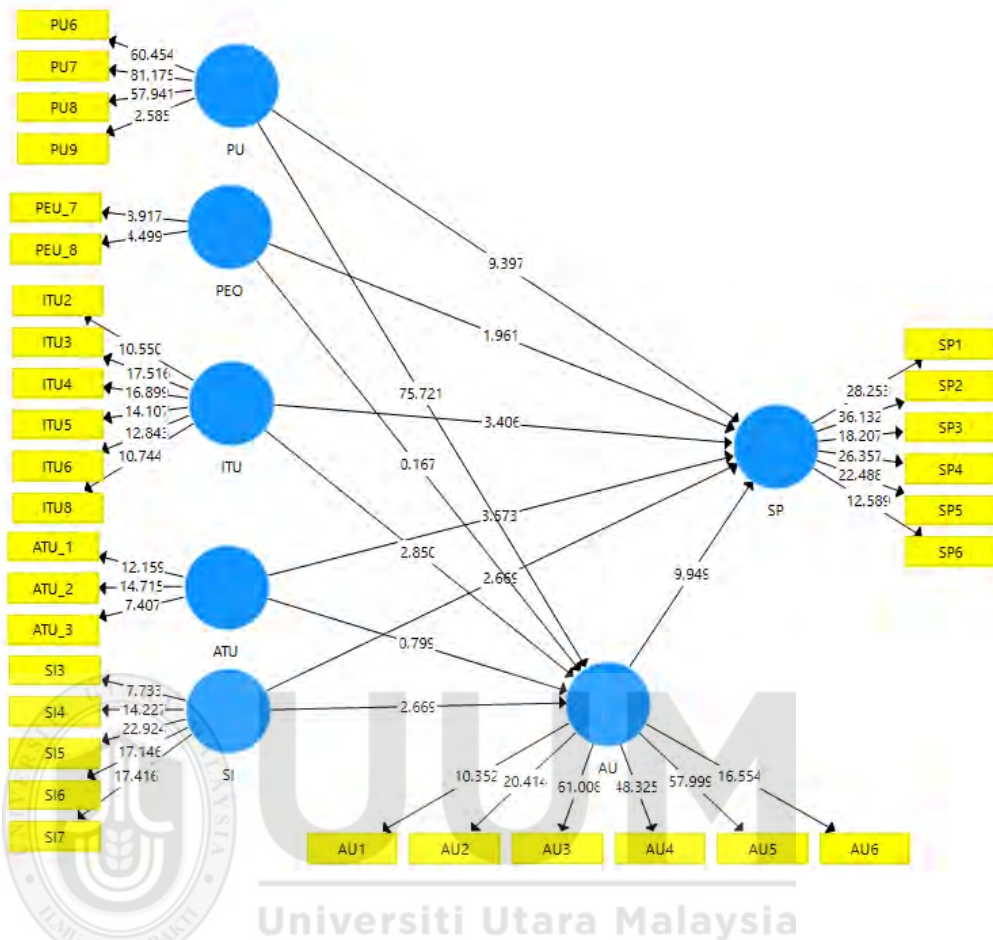


Figure 5.3
mediating effect model

Table 5.18
Results of Mediating Relationships (Indirect)

H0	Relations	USTD Beta (β)	SM	STD.	t-value	p-value	Decision
H7	PU-> AU ->SP	0.898**	0.891	0.091	9.904	0.00	Supported
H8	PEU->AU->SP	0.004 ^{No}	0.004	0.027	0.167	0.43	Not-Supported
H9	ITU->AU->SP	-0.070**	-0.065	0.025	2.767	0.00	Supported
H10	ATU->AU->SP	0.020 ^{No}	0.020	0.025	0.792	0.21	Not-Supported
H11	SI->AU->SP	0.073**	0.072	0.028	2.630	0.00	Supported

Note: ** Significance at $p < 0.01$

* Significance at $p < 0.05$

Not Significance at $p < 0.10$

In Figure 5.3 and Table 5.18 showed the mediating analysis results representations in pictorial and tabular forms separately. The results show that three of the five mediating relationships hypothesized, have statistically confirmed to be significant. Therefore, these three relationships have established strong proof at $p < 0.01$. Only that the mediating relationship of the actual use between ITU and SP shows negative, but still strong significant at (0.00). This indicates the authenticating mediating effect of the actual use of ICT facilities, as determining factor of improving staff performance. Particularly, the results of the three relationships that revealed the higher mediating effects of actual use variable on the relationship between perceived usefulness and staff performance at $p < 0.01$ ($\beta = 0.898$; $t = 9.904$); Intention to use and staff performance at $p < 0.01$ ($\beta = -0.070$; $t = 2.767$); social influence and staff performance at $p < 0.01$ ($\beta = 0.073$; $t = 2.630$).

While the results of the two relationships that showed positive, but not supported the mediating effects of actual use variable on the relationship between perceived ease of use and staff performance at $p > 0.10$ ($\beta = 0.004$; $t = 0.167$); and attitude toward use and staff performance at $p > 0.10$ ($\beta = 0.020$; $t = 0.792$) respectively. These results demonstrated that the two of the hypothesized relationships have shown a positive influence on the indirect relationship through actual use of technology facilities, but significant level at $p > 0.05$. These explain that, despite the positive influence, but proofed not significant. Thus, indirect effects of PEU and ATU on staff performance through actual use of technology attribute does not support staff performance.

5.7 Indirect effect path

This section is in line with research question two of this study, which dealt with the indirect effect. Hayes (2017) has recommended that a determination of the empirical mediation effect needs approximation and explanation of the direct and indirect effects along with inferential test thereof. Regarding this study, five variables encompassing perceived usefulness, perceived ease of use, intention to use, attitude toward use, and social influence were hypothesized to have the direct effect on mediating variable actual use.

5.7.1 Restatement of Indirect effect Hypothesis

This path concentrated on the hypothesized direct relationship between the five constructs, perceived usefulness (PU), perceived ease of use (PEU), intention to use (ITU), attitude toward use (ATU), social influence (SI) and a mediating construct actual (AU) (a presupposed Dependent variable) restating and validating.

- H¹² Perceived usefulness of ICT adoption (PU) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).
- H¹³ Perceived ease of use of ICT adoption (PEU) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).
- H¹⁴ Intention to use of ICT adoption (ITU) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).
- H¹⁵ Attitude toward use of ICT adoption (ATU) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).

H¹⁶ Social influence of ICT adoption (SI) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).

5.7.2 Results of Indirect Effect

This section shows the results of the direct effects of the hypothesized relationship involving five independent variables and mediating variable. A bootstrap resampling procedure (Efron & Tibshirani, 1993), using 5000 resamples (Hair, Hult, Ringle, & Sartedt, 2014; Janitza, Sauerbrei, & Boulesteix, 2016; Efron & Tibshirani 1993) was adopted.

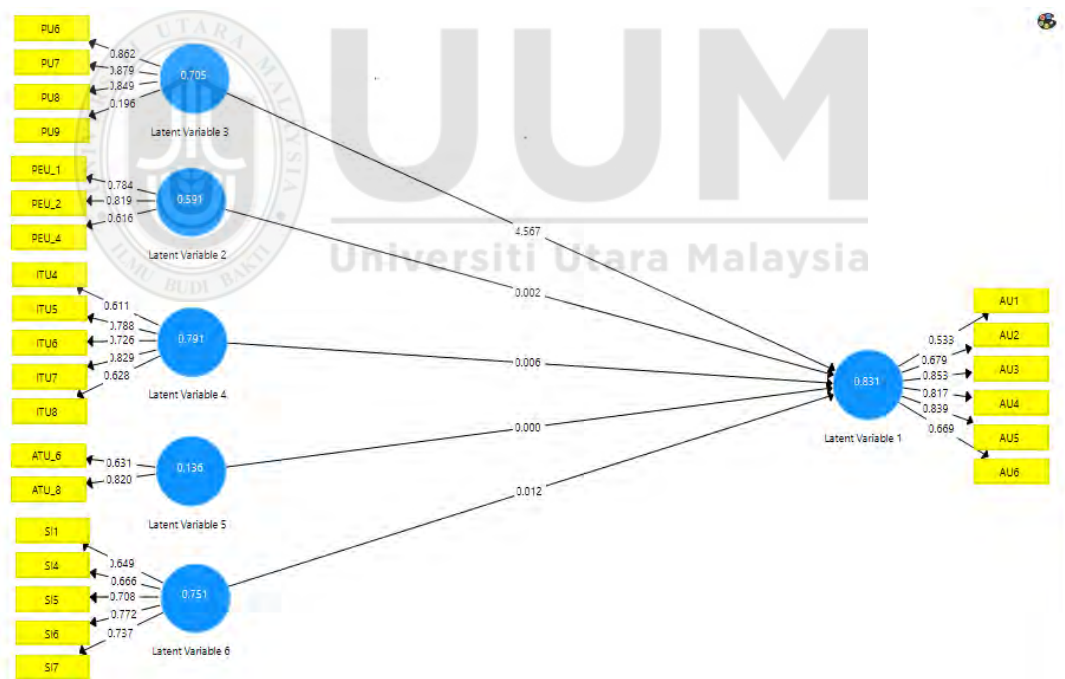


Figure 5. 4
Bootstrap between the independent variables and mediator

The graphical illustration of the bootstrap showing standardized path coefficient (β) and t-values for the hypothesized relationships is revealed in Figures 5.3 above. In

addition, the results of the bootstrap portray positive significant relationships of the three paths, (PU -> AU, ITU -> AU, and SI -> AU) while two (PEU -> AU and ATU -> AU) were proofed not significant.

Table 5.19
Results of Indirect Effect

H0	Relations	Beta (β)	SM	STD. Error	t-value	p-value	R ²	f ²
H12	PU -> AU	0.906**	0.906	0.012	5.721	0.00	0.83	4.589
H13	PEU -> AU	0.098**	0.004	0.027	0.167	0.43		0.000
H14	ITU -> AU	- 0.070**	0.066	0.025	2.850	0.02		0.021
H15	ATU -> AU	0.020**	0.020	0.025	0.799	0.21		0.002
H16	SI -> AU	0.074**	0.074	0.028	2.669	0.00		0.023

**indicates significance level at $p < 0.01$

* indicates significance level at $p < 0.05$

The standardized path coefficient (β), standard error, t – value and p – value explaining the relationship between the independent variables and the dependent variable is statistically portrayed in table 5.19 above. Consequently, out of the paths three portrayed positive relationships, while two were found not significant. Two out of the five paths showed strong significant positive effects at $p < 0.00$, one path significant positive at $p < 0.02$, whereas, two paths proved not significant at $p < 0.43$ and $p < 0.21$.

Specifically, as illustrated in table 5.19, the results shown strong positive significant influence perceived usefulness on actual use of ICT facilities ($\beta = 0.906$; $t = 5.721$, $p < 0.00$). Therefore, this implies that in the event of staff perception of the usefulness of ICT facilities will strongly influence his/her perceived usefulness on actual use of technology. The results corroborate with the initial hypothesized statement (H12).

Furthermore, the social influence of ICT adoption has a strong positive effect on staff actual use of technological attributes, ($\beta = 0.074$; $t = 2.669$, $p < 0.00$), thus supported hypotheses (H16). Yet, the significance positive influence of intention to use ICT facilities on actual use of technology was established ($\beta = -0.070$; $t = 2.850$, $p < 0.02$), intention to use ICT facilities increases his/her influence in actual use of technology. This supported hypotheses (H14). Then, perceived ease of use and attitude toward use of technology have not supported (H13 and 15).

5.8 Coefficient of Determination (R² value)

Here, there was an idea that a decent ungenerous model, must be the one that has greater R² value clarified by reasonable some fewer independent variables. The studied model consists of seven exogenous latent variables that have R² value of 0.36 in conformity with the categorization as R² value of (0.75) substantial, (0.50) moderate, as well as (0.25) weak, correspondingly, (Henseler, Ringal & Sinkovics, 2009; Hair, Ringle & Sarteeds, 2011). R² value evaluation for the dependent variables want to observe the changes after a particular independent variable was omitted.

5.9 Effect Size (f²)

The effect size of (f²) has been calculated to enable us to understand the amount to which an individual independent variable contributes among other independent variables in a relationship with a dependent variable (s). In this regards, we the significance and non-significance levels of existence of the phenomenon of interest in

the population. As portrays in Table 5.20 using the criteria of Cohen, the (f^2) value for each of the independent variables was consequently calculated using observing changes within the value of (R^2) when an identified exogenous latent variable was omitted deliberately from the model. Particularly, if $f^2 = R^2_{\text{included}} - R^2_{\text{excluded}}$, 1 – R^2 included formula was used. Nevertheless, in spite of the difficulties in understanding the suitable effects size range, there was a view by Cohen (1988) that shows (f^2) value of 0.02 as small, 0.15 medium and 0.35 large effect sizes separately.

Table 5.20

Effect Size for individual Variables based on Cohen (1988)

Variable	f^2 value	Effects Size
Perceived Usefulness (PU)	0.288	Medium
Perceived Ease of Use (PEU)	0.011	Small
Intention to use (ITU)	0.025	Small
Attitude Toward Use (ATU)	0.043	Small
Social Influence (SI)	0.023	Small
Actual Use (AU)	0.260	Medium

The individual dependent latent variable f^2 result shows that f^2 value perceived usefulness and actual use are all mediums at (0.288) and (0.260) respectively. Then, the remaining four, thus, perceived ease of use, intention to use, attitude toward use, and social influence were small at (0.011), (0.025), (0.043), and (0.023), respectively.

5.10 Blindfolding and Predictive Relevance (Q^2)

This has little similarity with the f^2 value, the measurement of the cross validated redundancy is in line with the world bank (1982) assessment criterion that can be utilized in measuring model predictive accuracy – (Q^2) (Stone, 1974; Geisser, 1974). The (Q^2) value of the stone, can hence be utilized to measure the predictive relevance

of the model in (Hair, Sarterdt, Pieper, & Ringle, 2012). In Smart-PLS the predictive relevance requires precise data point predictions of indicators within the reflective measurement models of independent variables and single construct dependent.

Nonetheless, Q^2 value does not put on formative dependent variables. Within the structural model, especially the reflective dependent variables can be able to predict relevant as long as it Q^2 values is higher than zero (Hair, Hult, Ringle, & Sarterdt, 2014). The Beta blindfolding SmartPLS process was applied in order to gain Q^2 value for the dependent variable of this study as a single-item variable. The Q^2 value for single item dependent variable for this study, staff performance using information and communication technology (ICT) is (0. 208). With this value, relatively the studied model has substantial predictive relevance.

Table 5.21
Predictive Relevance

Variable	Communality	Redundancy
SP	0.483	0.208
PU	0.345	
PEU	0.005	
ITU	0.332	
ATU	0.112	
SI	0.281	0.418
AU	0.380	

5.11 Summary

In this study a model of staff performance using information and communication technology (ICT) facilities that the hypothesized mediation role of actual use of ICT facilities in the relationship between technological features and performance of non-

teaching staff. The model described 65% variance of staff performance using ICT facilities and came up with substantial predictive relevance of 0.36

We analyzed the mediating relationships statistically in the projected model by testing the direct effects between exogenous constructs and the endogenous construct, between the mediating construct and dependent construct; and therefore, for mediating the effects of actual use in the relationship between the hypothesized exogenous constructs and the endogenous construct.

Yet again, the significant positive relationships were revealed in the model encompassed of all the six direct main effects, three mediating effects of actual use of information and communication technology facilities, and three indirect effects, in the relationship between perceived usefulness, intention to use, social influence and staff performance, as well as the relationship between the perceived usefulness, intention to use, social influence and actual use. Although, the results of the mediating and indirect effects, of actual use in the relationship between perceived ease of use and attitudes towards use, on staff performance; and the relationship between perceived ease of use and attitudes towards use on actual use, demonstrated positive but not significant. Table 5.22 below portrays the hypothesized relationships' summary of the findings, which shows that out of the sixteen hypothesized relationships, twelve were significantly supported, while four were not supported.

Table 5.22

Summary of Hypothesized Relationships and Findings

H ⁰	Hypotheses	Findings
H ¹	There is a positive relationship between the perceived usefulness (PU) and staff performance (SP).	Supported
H ²	There is a positive relationship between perceived ease of use (PEOU) and staff performance (SP).	Supported
H ³	There is a positive relationship between intention to use and staff performance (SP).	Supported
H ⁴	There is a positive relationship between attitude toward use and staff performance (SP).	Supported
H ⁵	There is a positive relationship between social influence (SI) and staff performance (SP)	Supported
H ⁶	There is a positive relationship between actual use (AU) and staff performance (SP)	Supported
H ⁷	Actual use (AU) of ICT facilities mediates the relationship between the perceived usefulness (PU) and staff performance (SP).	Supported
H ⁸	Actual use (AU) of ICT facilities mediates the relationship between perceived ease of use (PEU) and staff performance (SP).	Not-Supported
H ⁹	Actual use of (AU) ICT facilities mediates the relationship between intention to use (ITU) and staff performance (SP).	Supported
H ¹⁰	Actual use of (AU) ICT facilities mediates the relationship between attitude toward use (ATU) and staff performance (SP).	Not-Supported
H ¹¹	Actual use (AU) of ICT facilities mediates the relationship between Social Influence (SI) and staff performance (SP).	Supported
H ¹²	Perceived usefulness of ICT adoption (PU) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).	Supported
H ¹³	Perceived ease of use of ICT adoption (PEU) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).	Not-Supported

H ¹⁴	Intention to use of ICT adoption (ITU) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).	Supported
H ¹⁵	Attitude toward use of ICT adoption (ATU) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).	Not-Supported
H ¹⁶	Social influence of ICT adoption (SI) has significant impact on non-teaching staff perception of actual use of ICT facilities (AU).	Supported



CHAPTER SIX: QUALITATIVE DATA ANALYSIS

6.1 Introduction

Preceding chapter presents and discusses the quantitative data analysis. This section presents a step-by-step technique of data analysis of the qualitative approach. In this chapter, data were collected using face-to-face interview and analyzed using the thematic method. Furthermore, the issue of subjective data, instrument of validity and reliability were discussed. Thus, the qualitative data analysis and discussion were made using Nvivo software. Eventually, in this chapter, interpretations, summary and conclusion of the qualitative methods were also discussed.

6.2 Sampling Procedure

This section dealt with the sample technique used to select the sample size from the population of this study.

6.3 Purposive Sampling Procedure

The purposive sampling technique this study implores, is to ensured fair representation and response from the target population of this research. This is due to its capability to think critically and pronounce the population's parameters that is proposed to be studied initially (Miles & Huberman, 1994).

Table 6.1

Category and Numbers of the Selected Informants

S/No	Category	Interpretation	Frequency
1.	A	Staff of Aminu Saleh College of Education, Azare	Not accessed
2.	B	Staff of Abubakar Tatari Ali Polytechnic, Bauchi	2
3.	C	Staff of School of Health and Technology, Ningi	2
4.	D	Staff of College for Legal and Islamic Studies, Misau	2
5.	E	Staff of Bauchi State University Gadau	Not accessed
6.	F	Staff of Abubakar Tafawa Balewa University	2
Total			8

6.4 Interview Protocols

Interview protocol has been developed by the researcher that enlightens the objective of this study, the Place of the interview, interviewees' approval, and preliminary interview questions, as background information. The guides of this interview protocol were implemented in accordance with the recommendation of Creswell (2012).

These are the guidelines listed below:

- i. Gaining approval from the interviewee to partake in the study.
- ii. Selecting a conducive place for the interview.
- iii. Having a prearranged and elastic questions at the time of the interview.
- iv. Starting the interview with the formal introduction.
- v. Recalling the respondents' secrecy of their responses.
- vi. Taping audio and note taken of interview data, with the approval of the respondents.

- vii. Receiving overall descriptive information.
- viii. Struggling for impartial and open-minded responses.
- ix. Using actual probes to acquire supplementary information.
- x. Shows appreciations after the interview.

6.5 Data analysis

In this study, the qualitative data analysis encompasses a systematic as well as several explanations and substitution of concepts of simple nominal level variable, such concepts, themes, or general ideas. Therefore, a different technique other than the use of statistical or quantitative data analysis was used. Below are the steps of qualitative analysis for this study.

6.5.1 Pre-interview

During the pre-interview, the researcher approaches different individual interviewees established on comprehending of the communities' main traditions. The interviewees were contacted independently at their offices, homes, as well as on the streets. Moreover, letters were dispatched in a formal way to their corresponding institutions, seeking for approval. Therefore, the following steps were involved during pre-interview.

6.5.2 Seeking Consent of Prospective Interviewee

For seeking consent of the potential interviewee, the researcher wrote and distributed official introductory letters to the Registrars of the relevant institutions of the selected

non-teaching staff. The introductory letters were attached with appropriate documents backing the research, indicated the purpose of the study, as well as the methodology and designed it involved. Meanwhile, the letters required approval for conducting the interview with some of the chosen non-teaching staff of the institutions. Furthermore, in the process of the physical interactions with the interviewees, the researcher clarified the content of the letters and responded to the more clarification questions asked by the staff. Yet, the researcher asked the interviewees to propose for the time and venue at their convenience for the meeting. Similarly, the researcher made available the questions of the semi-structured interview to the interviewees for rehearsal.

6.5.3 Interviews and Data Management

The sessions of the interview were done in quiet places with minimal disturbances. The one on one interview were conducted, at the time the researcher asked the participants open-ended pre-set questions and followed by the other probing questions required to clarify information. The interview responses, were taken down the content of the information and audio taped, subjects with the approval of the interviewees. However, after the interview, for the purpose of any needs arises, hence the participants personal contact information was documented. Therefore, the records of interview responses were transcribed and converted into text, which is called “transcript-base analysis” as described by Krueger (1994); Schilling (2006); Bernard, Wutich, and Ryan, (2016). After transcribing the interview data with the help of English experts, below are the stages of the interview adopted, in figure 6.1 below.

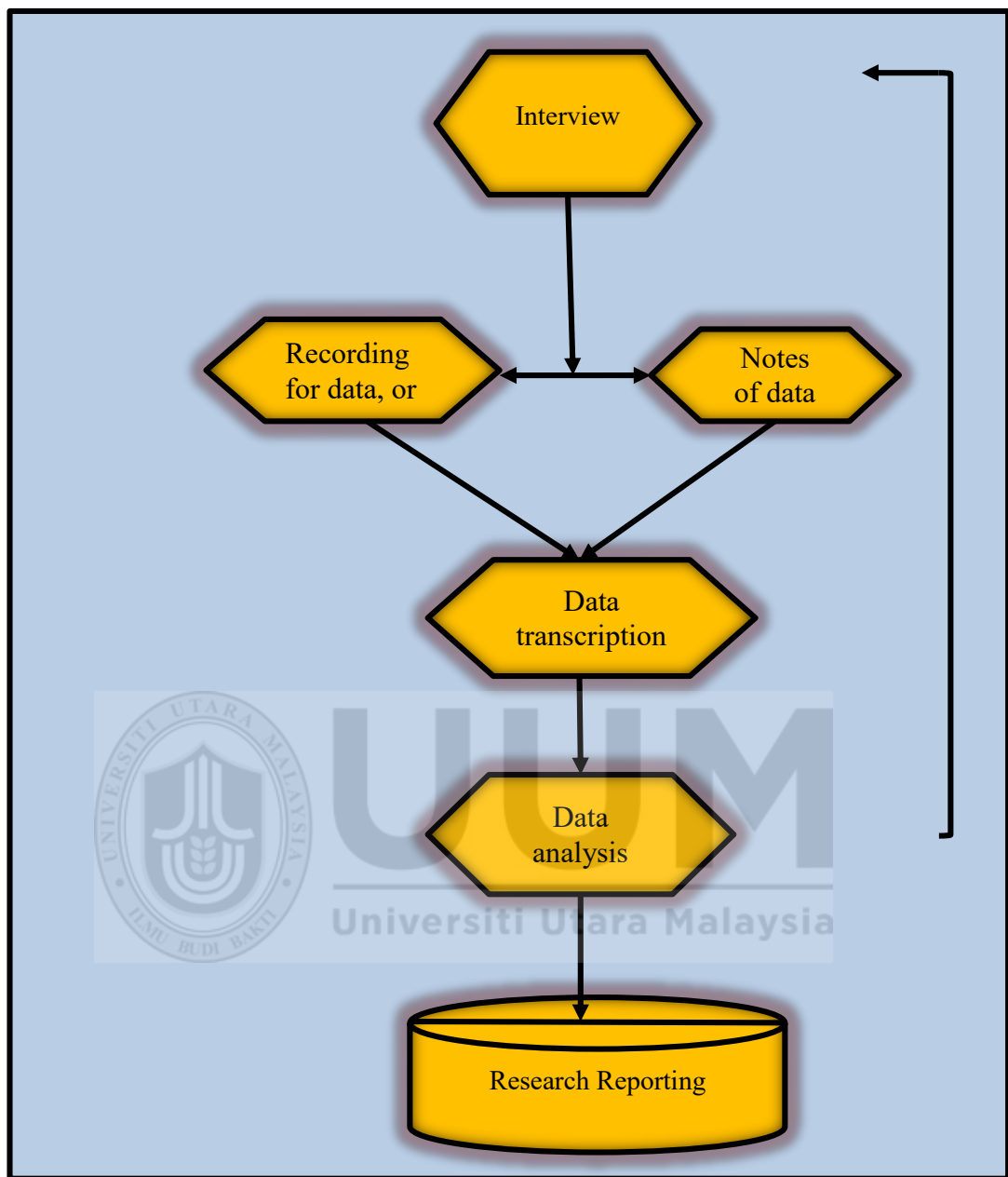


Figure 6.1

Interview and Data Management Stages

Sources: Adopted from Cassell, Catherine, and Gillian (2004); Creswell and Creswell (2017)

The chart above illustrates the interview and data management at a glance. It shows the numerous stages involved in how data collected, managed as well as how it reported. This described that, at the stage of data analysis, for more confirmations and

clarifications of ideas, the arrow showed that the researcher returned backed to the interviewee(s).

6.5.4 Cording Procedure

During the coding procedure, after transcribing the data, the researcher commenced the analysis with coding the data, to see the outline from the large volume of text. The coding procedure the researcher adopted was in accordance with the techniques of Saldana (2015). Thus, themes, repeating ideas, relevant text, theoretical constructs and narrative. Therefore, using Nvivo software of qualitative analysis, the data were coded according to the themes developed. Meanwhile, after relevant grouping, themes and related sub-teams were allocated to the wider domains.

Table 6.2
Showing General Profile of Interview Informants

Category	Interview Respondents	Frequency
A (Staff ASCOEA)	Senior Non-teaching Staff	1
	Senior Staff from ICT Unit	2
B (Staff ATAP)	Senior Non-teaching Staff	1
	Senior Staff from ICT Unit	2
C (Staff SH&TECH)	Senior Non-teaching Staff	1
	Senior Staff from ICT Unit	2
D (Staff CLIS)	Senior Non-teaching Staff	1
	Senior Staff from ICT Unit	2
Total		12

6.5.5 Reporting

In reporting the opinion of the informants, it is appropriate to note that, the researcher should try to present the original wordings of the informants. Nevertheless, the researcher made certain obvious editing's of these, spelling, punctuations as well as faltering, which could distress the readability of text and as well might complicate the reader (Bloor, Frank land, Thomas & Robson, 2001)

6.6 Demographic Data

In demographic data, the study examines the justification of selected participants across senior staff, intermediate staff and ICT unit staff of the public tertiary institutions. The summary of the demographic information of the interviewees was presented in table 6.3 below.

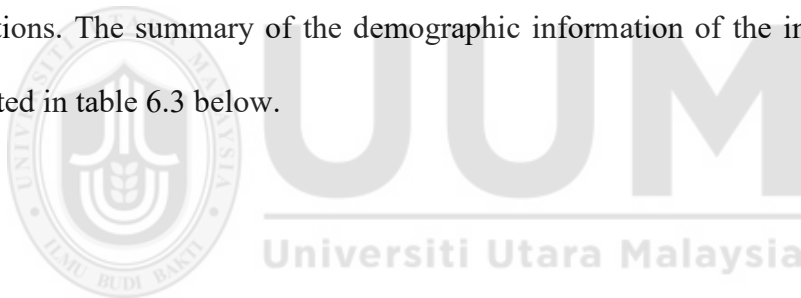


Table 6.3

Summary of Demographic information of the Interviewee

Interviewee	Frequency	Percentage
Category		
Senior Staff	2	25%
Intermediate Staff	4	50%
Senior staff from ICT Unit Staff	2	25%
Gender		
Female	0	0%
Male	8	100%
Age		
Young (18 - 30)	3	37.5%
Middle (30 - 45)	3	37.5%
Older (45 and above)	2	25%
Educational Qualification		
Lower	3	37.5%
Higher	5	62.5%
Institutions		
University	3	37.5%
College of Education	3	37.5%
Polytechnic	2	25%
Computer Literacy		
No computer skills	0	0%
Basic computer skills	5	62.5%
Advance computer skills	3	37.5%

Table 6.4

Summary of the themes and sub-themes

Themes	Sub-theme	Informant
1. Potential challenges of ICT adoption in public tertiary institution in Nigeria.	• Computer literacy.	3
	• Corruption	7
	• Electricity/ Generator fuelling	5
	• Inadequate ICT Facilities	4
	• Lack of Training	6
	• Network Problem	4
	• Weather and structure	6
2. Strategies for improving staff performance.	• Adequate funding	7
	• Availability of ICT facilities	3
	• Constant electricity supply.	5
	• Fight against corruption	2
	• Maintenance services	2
	• Mandating use of ICT to staff	2
	• Good Internet service.	2
	• Rehabilitation of structure.	1
	• Staff training and adequate manpower	4
Total		63

The above table displays the themes, sub-teams and a number informant of this study.

There are two (2) themes, sixteen (16) sub-teams and sixty-three (63) interviewees

identified. Theme one (1) potential challenges of ICT adoption in public tertiary institutions in Bauchi, Nigeria, has seven (7) sub-teams, thus, computer literacy, corruption, electricity/Generator fuelling, inadequate ICT facilities, lack of training, network problem and problem of weather and structure. Moreover, in the other hand, theme two (2) strategies for improving staff performance, has nine (9) sub-teams, include, availability of ICT facilities, constant electricity supply, fight against corruption, maintenance services, mandating use of ICT to staff, Good internet service, rehabilitation of structures, and staff training/adequate manpower. Nonetheless, for the purpose of ensuring respondents' confidentiality, the study used some codes, thus, informant 1, informant 2, informant 3, informant 4 etc. As portrays in the table 6.4 above.

6.7 Factors with Potential Challenges of ICT Adoption in Public Tertiary Institutions of Bauchi state, Nigeria and Strategy for Improving Staff Performance.

This is another objective of this study, aimed to explore factors with the potential challenges of information and communication technology adoption in public tertiary institutions of Bauchi state, Nigeria. In this section, thematic interpretations of the informants regarding the objectives were introduced. Therefore, through the above steps of analysis outlined, the themes developed were characterized into broader themes, as well as sub-themes as illustrated in Figure 6.2 below.

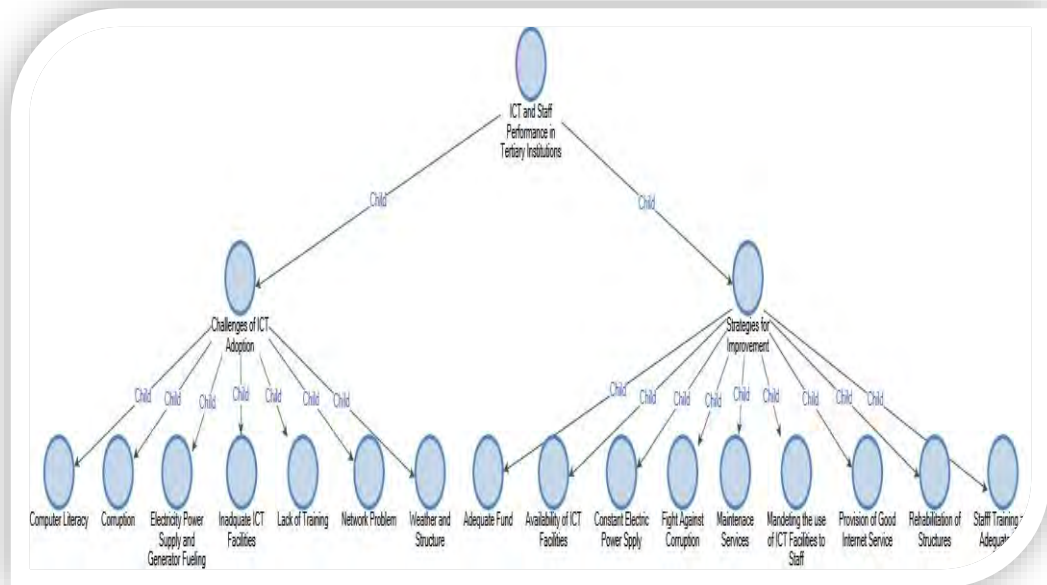


Figure 6.2
Qualitative Model of Factors with Potential Challenges of ICT Adopt and Strategy for Improving Staff Performance.

The above figure 6.2 displays the Themes, sub-themes and the Interviewees who responded to the questions of this study. The sub-themes established from the interviews conducted, and the interviewees (informants).

6.7.1 Theme 1: Potential Challenges of ICT Adoption

Regarding the developed themes, interviewees' ideas/opinions concerning the research objective were provided. At this point, the emerged themes (Potential Challenges of Information and Communication Technology Adoption) were supported with explanations of the interviewees' words to the best of efforts. Therefore, this serves as a linkage between this objective and subjective opinions/ideas of the interviewees, as shows in figure 6.3 below.

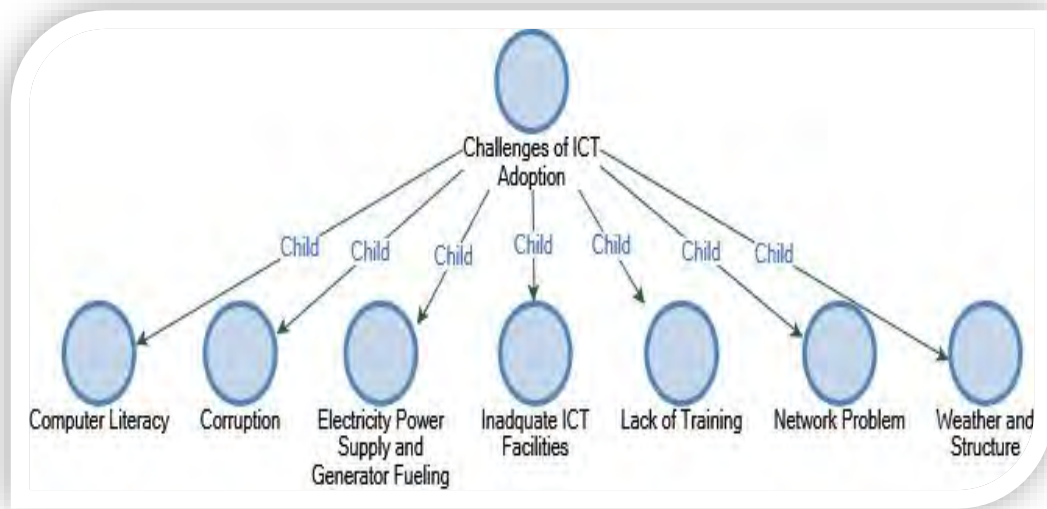


Figure 6.3
Model of potential challenges of ICT adoption in public tertiary institutions.

Figure 6.3 portrays that, the theme, challenges of information and communication technology adoption in public tertiary institutions, and seven numerous sub-themes. Thus, computer literacy, corruption, electricity power supply & generators fueling, inadequate ICT facilities, lack of training, Network problem and weather/structure, respectively.

6.7.1.1 Sub-Theme 1: Computer Literacy

Computer literacy is one of the sub-themes of the seven potential challenges of information and communication technology (ICT) in public tertiary institutions. This theme shows the explanations from the informant B1, C1, and D1 words to the best of efforts, as displays in figure 6.4 below.

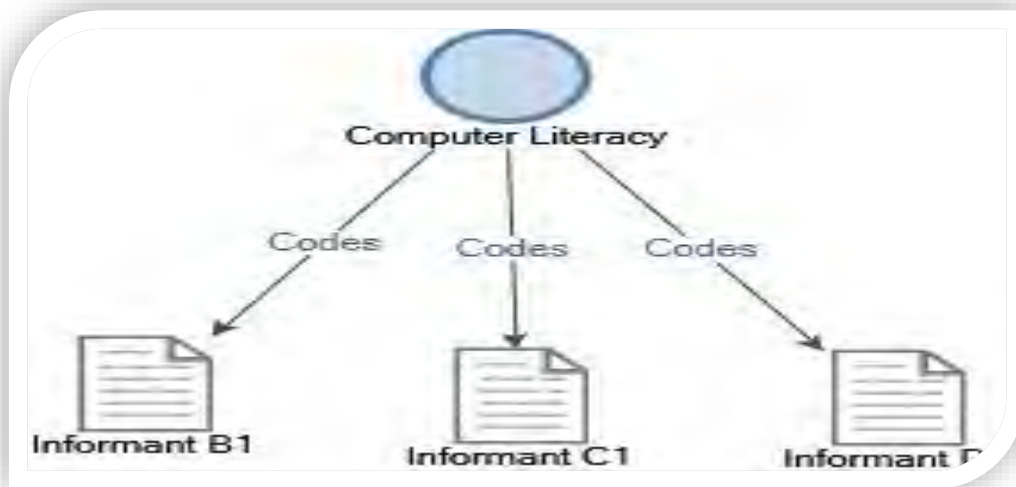


Figure 6.4:
Model of computer Literacy challenge.

Computer literacy is a sub-theme that emerged and were backed with clarifications from the interviewees' words. Therefore, one of the informant from ATAP Bauchi has this to say:

"Yes, really, we have, most of the staff here have little or more computer literacy, but they do not make use of them in their daily routines. Very few of the non-teaching are using their computer for office work. Some staff usually prepare to continue with their traditional and manual system of operation in office." (Personal Interview with informant B1).

Furthermore, he revealed that, Moreover, some staff at this institution, doesn't have plan to further their education, instead, they were given up the study and became uninterested in furthering their education. Although some were about to retire, and I think is one of their reasons why they believed that they will not benefit from additional qualifications at the retirement age (Personal Interview with informant B1).

Moreover, another interviewee also enlightens that:

“Actually, we have less than one hundred non-teaching staff, both permanent, part-time, and casual staff. We have not more than fourteen of them that are computer literates that could operate the computer system in discharging their primary responsibility. Moreover, they are not fully utilizing the computer system in their offices task...” (Personal Interview with informant C1).

Similarly, another informant has similar enlightenment on the same challenges of computer literacy as explained by the informant C1 above, as follows:

“Certainly, we have many of them, but they are not acquainted with the computer skills, due to the fact that semi-automatic operation is being the predominant practice that is presently being put into use. Therefore, they did not possess personal computers. But even if they do, it may only be utilized for their personal work. Meanwhile, only in the school computer centers where every staff can have access to computers.” (Personal Interview with informant D1).

Similarly, this issue of computer literacy challenge in public tertiary institutions which explain by the informants B1, C1 and D1, has commensurate with the view of some scholars. Mingaine, (2013) & Teo, Milutinović, and Zhou, (2015), whose examine the challenges of teachers’ skills in utilization of Information and communications technology in public institutions, have this to supplement:

“The staff should keep revising the current ICT policy in order to overcome the challenges deterring the smooth ICT adoption and utilization in schools, as well as policy makers, they should also keep revising the existing information and

communication technology policy so as to do away with the challenges obstructing the smooth use of ICT facilities in tertiary institutions in Kenya and. Staff should also ensure they acquire basic knowledge of ICT, to enable appropriate use of ICT in schools.” (Mingaine, 2013 & Aydin, 2013).

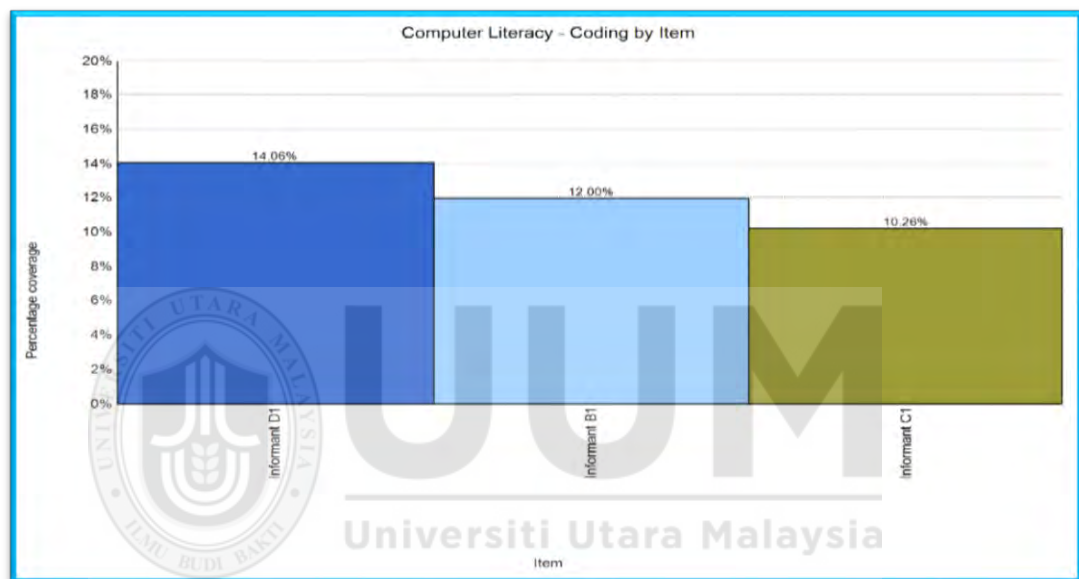


Figure 6.5
Informant responses on the sub-theme computer literacy

In the figure 6.5 above, it clearly indicated that the responses on the sub-theme computer literacy, the informant D1 has the highest responses percentage of 14.06, informant B1 has 12 percent and Informant C1 has 10.26 percent, respectively.

6.7.1.2 Sub-Theme 2: Corruption

Corruption is among the sub-themes of the theme 1, potential challenges of information and communication technology (ICT) adoption in public tertiary institutions. This sub-theme expresses the level of explanations from the informant A1, A2, B1, B2, C1, C2, D1 and D2 expressing an opinion to the greatest of their ability, as displays in figure 6.6 as follows.

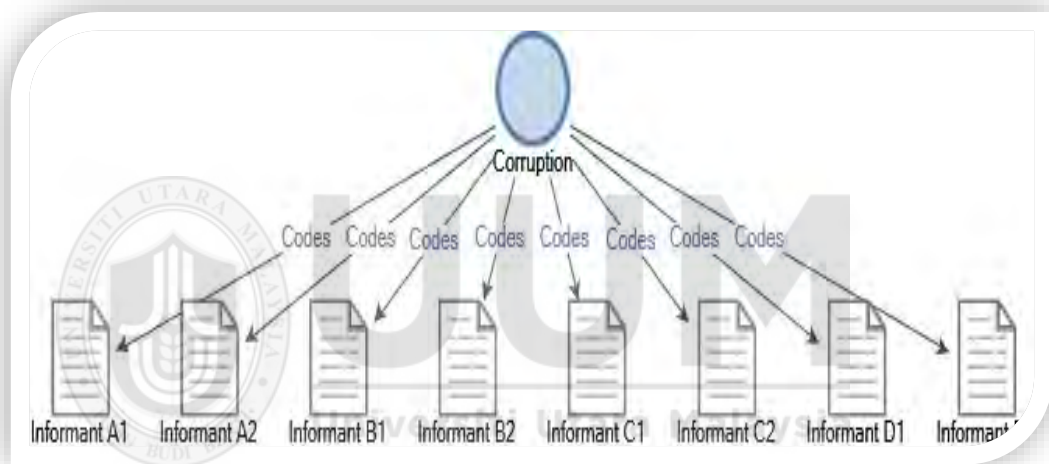


Figure 6.6
Model of Corruption.

Corruption in the educational sectors has become one of the key concepts in social science, particularly in Nigeria. It also spreads widely to many sectors, such as, politics, public service, health and agriculture etc. (Famade, Omiyale, & Adebola, 2015). The stakeholders of higher education settings, who involved in corrupt practices, are among the commonly pre-occupied factors for the existing outrageous development and the condition of the tertiary educational institution in the country

today, (Ewa, 2013 & Famade, Omiyale, & Adebola, 2015). In regards to the common challenges faces by the Nigerian tertiary institution, one of the informants mourned that:

“Nevertheless, corruption is one of the problems that can affect staff performance in tertiary institutions in Nigeria. This problem of corruption is becoming a pathetic, and affecting both non-teaching and academic Staff. Corrupt practices in tertiary institutions has come popular” (Personal Interview with Informant, A1).

He, therefore, continued to explain that:

“Similarly, corruption in the education sector has become a key problem worldwide. Corruption among public servants, and the stakeholders of the higher education settings become the commonly used practice, which hindered the progress of the tertiary education institutions in the country. It is believed that corruption is spreading widely in the educational system in Nigeria. (Personal interview with Informant A1).

Similarly, Informant A2 also contributed on the same vain that:

“Corruption is the dominant problem affecting the resources of every organizational sector. It hinders the progress of the education system directly or indirectly. Corruption in the education sector has become a clamoring issue today.” (Personal Interview with informant A2).

He therefore continued:

“The occurrence of corrupt practices in higher educational institutions seems to deny the core values of education within this level. Scopes of corruption recognized the inclusion of students, teaching staff, and non-teaching staff. The students’ forms of corruption included given bribes to the lecturers for free marks allocation and examination malpractice. Lecturers also sells

illegal handout to students and requesting sex from innocent students through free marks allocation. While in the other hand, non-teaching staff, involved during admission and registration exercise. (Personal Interview with informant A2)

Moreover, the above description has teamed up with the view of Informant B1, B2, C1, C2, D1, and D2. Actually, the corruption refers to as the decision making process degeneration in which a stakeholder strains deviation from the normal procedure which should be good for his/her decision's conclusion, as a result of expecting promises or rewards, while this will make him/her change the decision to suit the rewards given side. This problem of corruption is directly or indirectly affecting the whole system.” (Informant B1). For example, Wang et al. (2011), “Consequently, several tensions ascend from this rapid changing, in the global political, social, and commercial environment (Wang et al., 2011). Leaders in a particular organizations are dealing with important cultural challenges, more especially in respects to bribery, corruption and responsibilities of social corporate.”

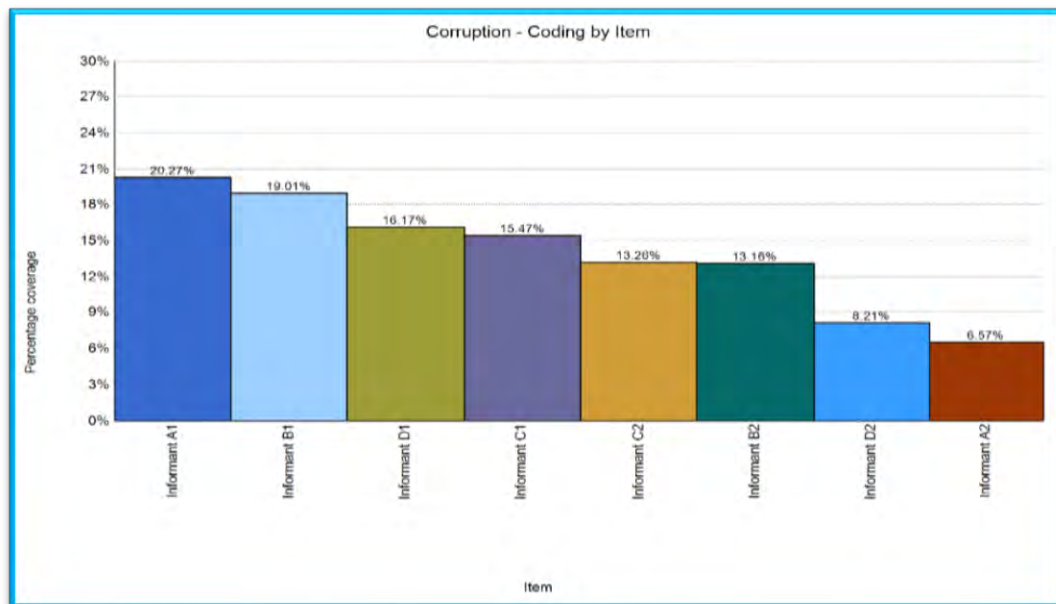


Figure 6.7
Informant responses on the sub-theme corruption

The above figure 6.7 openly showed that the responses on the sub-theme corruption, has eight informants with different response percentages, thus: informant A1 (20.27%), B1 (19.01%), D1 (16.17%), C1 (15.47%), C2 (13.28%), B2 (13.16%), D2 (8.21%), and A3 (6.67%). The interviewees on corruption and most of the respondents said the corruption was one of the key factors that will hinder the enhancement of staff performance in public tertiary institutions in Nigeria.

6.7.1.3 Sub-Theme 3: Electricity Power supply/ Generator Fueling

Challenges of electricity power supply/Generator fueling is one the sub-teams from the theme 1, challenges of information and communication technology (ICT) adoption in public tertiary institutions. This sub-theme comprises of five informants (A1, A2,

B2, C2, and D2) with their explanations and expressing opinion based on their experience, about the sub-theme, as shows in figure 6.8.

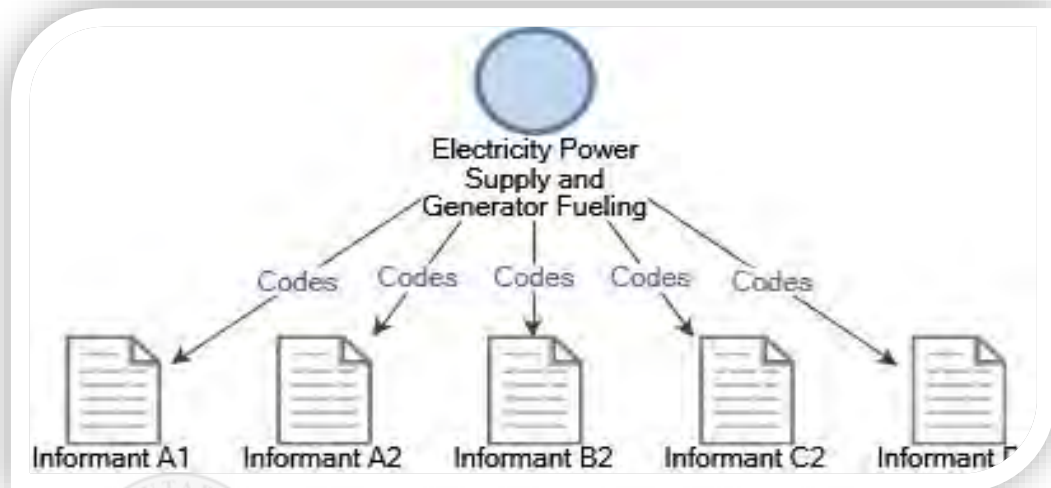


Figure 6.8
Model of Electricity Power supply/ Generator Fueling.

Electricity power is one of the major factors that is indispensable to every nation today, but is always inadequate in most of the developing countries. This is a severe challenge that threatens the development of many sectors, (Mc Carney, Robertson, Amaud, Lorenson, & Lioyd, 2013). In line with this scholar, one of the informant has this to say:

“Power supply is inadequate, because PHCN were not making frequent supplying, and even if they do, it will not last longer. Power interruption, always without notice, for these reasons, there is the need for a standby generator to serve as an alternative to power supply.” (Personal Interview with Informant A2).

Moreover, on the same vain, this Informant also contributed that:

“Actually, generator fuelling is expensive, but is a necessity. No can operate without the power. Whereas, fuel is now around N145 per litter, and every day School is spending thousands of Naira for fuelling of which yearly the sum will amount to hundreds of thousands of Naira” (Personal Interview with Informant B2).

Similarly, informant C2, contributes to the explanation given by the informant B2 above, saying that:

“Moreover, poor power supply in Nigeria is something historical, from one administration to another. Considering the nature of Nigerian population and the natural resources we have, the country that got independence since 1960, yet power supply is below standard, unlike the developed countries, where electricity power is twenty-four hours, available in both urban and rural areas. This necessitated the entire country in developing nations to rely on generators to stand as the alternative to electricity power” (Personal Interview with informant C2).

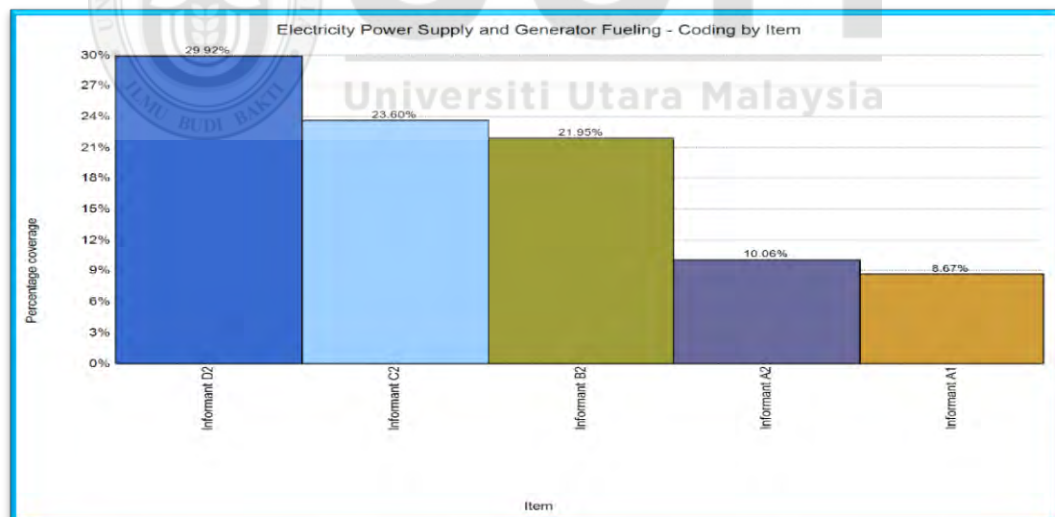


Figure 6.9
Informant responses to the sub-theme problem of Electricity power supply and Generator fuelling.

Figure 6.9, shows that the sub-theme problem of electricity power supply and generator fueling, has five informants with different percentages, thus: informant D2 (29.92%), C2 (23.60%), B2 (21.95%), A2 (10.06%), and A1 (8.67%). The interviewees on problem of electricity power supply and generators' fueling, and most of the informants said problem of power supply and the cost of fueling generators is negatively affecting staff performance in public tertiary institutions of Bauchi state, Nigeria.

6.7.1.4 Sub-Theme 4: Inadequate ICT Facilities

The pillars of ICT are the communication processes and its facilities. ICT facilities refer to information and communication technology's accessories such as computers and its components, the Internet, mobile phones, fixed-line telecommunication, wireless devices, networks, Barcode scanners and global positioning systems. (Economic development ministry in Singapore, 2004, as cited by Nchunge, Sakwa, & Mwangi, 2013). This sub-theme inadequate information and communication technology (ICT) facilities comprises of four informants such as, informant A2, B2, C2 and D2 respectively, as showing in figure 6.10.

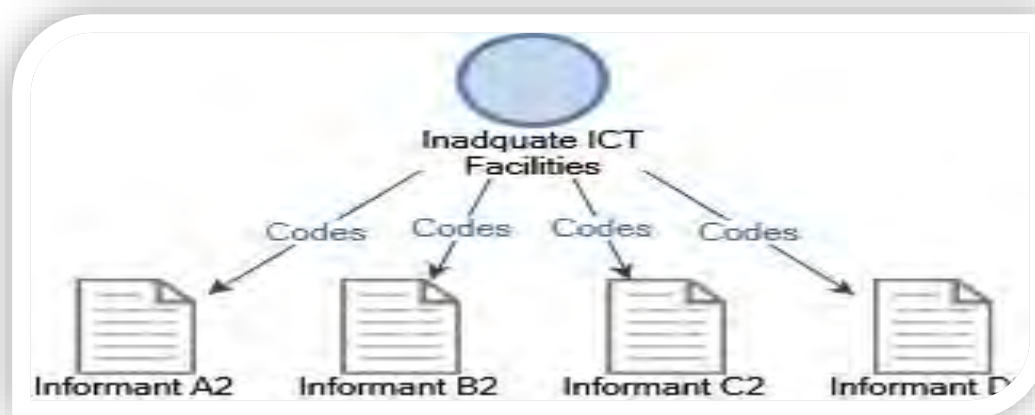


Figure 6.10
Model of Inadequate ICT Facilities.

Inadequate ICT facilities hinders the proper ICT Usage, this came in contrast with the view of the informant A2, B2 and C2 that says:

“We have a number of ICT facilities, but actually are not adequate enough to accommodate the number of non-teaching staff we have. Similarly, the internet services we used is not enough to accommodate all. That is what make all the departments to own internet service provider” (Personal Interview with informant A2, B2 and C2)

Furthermore, in line with the above statement, informant C2 has a similar view that, ICT facilities they have actually, were not adequate enough to the extent that all staff can have access to. He therefore stated that:

“The facilities on the ground are only in the computer room and the respective secretaries’ offices. So, some of the staff that possessed personal laptops, used them in office. But actually are not enough for staff to enhance effective performance.” (Personal interview with Informant C2).

Similarly, these views come into conformity with the opinion of other scholars, Oye, Lahad, and Rahim, (2014), have the view that inadequate information and communication technology facilities, excess workload, funding were recognized as the key challenges to ICT use sage. Furthermore, the staff of the University will expect to use information and communication technology facilities to improve their performance in discharging their office responsibilities and find it easy to use. Therefore, the provision of adequate and relevant hardware, software, training and support should be provided by the management (Oye, Lahad, and Rahim, 2014).

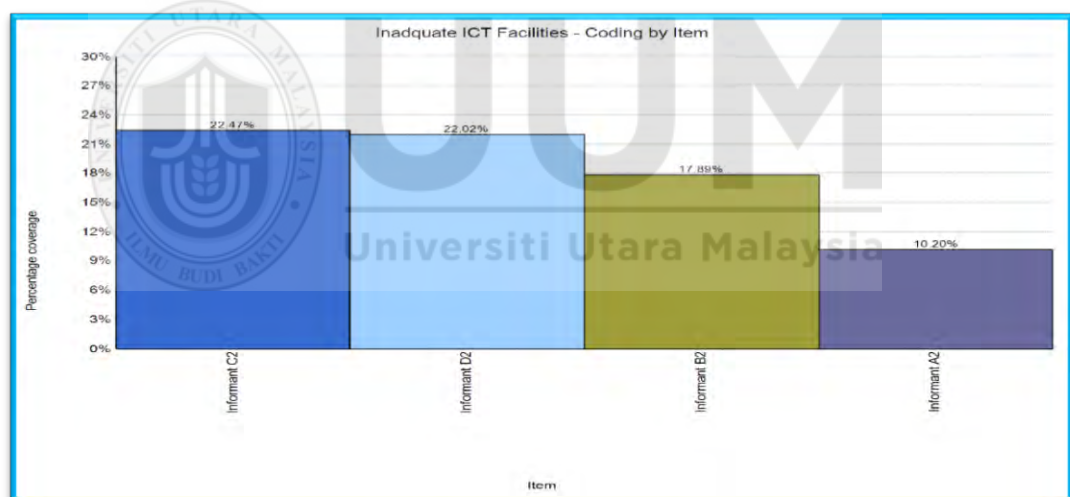


Figure 6.11
Informant responses on the sub-theme inadequate ICT facilities.

Figure 6.11 above, portrays that the sub-theme inadequate information and communication facilities, comprises of four informants responded in different percentages, informant C2 (22.47%), D2 (22.02%), B2 (17.89%), and A2 (10.20%).

The responses indicated that inadequate information and communication facilities affects staff performance in public tertiary institutions of Bauchi state, Nigeria.

6.7.1.5 Sub-Theme 5: Lack of Training

Lack of training is the sub-theme under theme 1, Potential Challenges of Information and Communication Technology Adoption in public tertiary institutions. This sub-theme lack of training comprises of 6 of informants, thus, Informant A1, InformantB1, informant B2, informant C1, informant C2 and Informant D1, respectively.

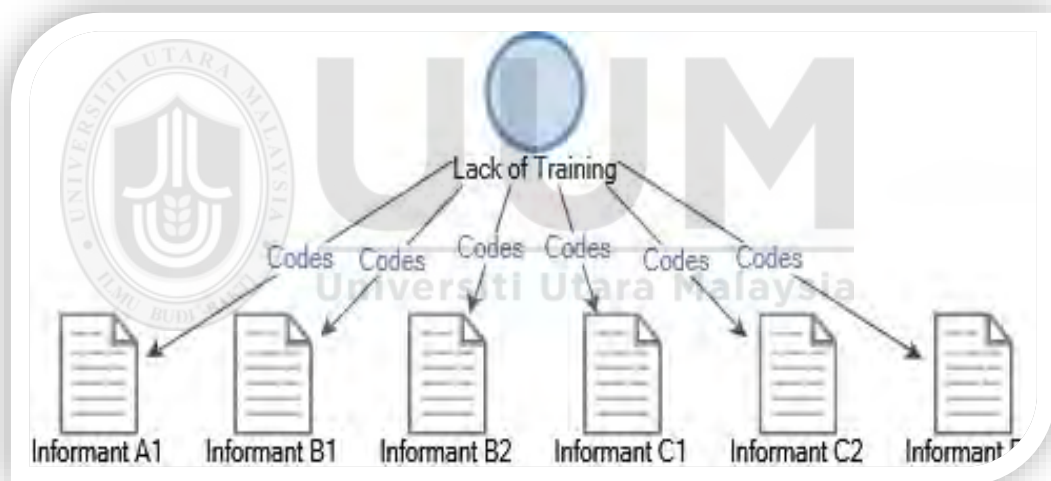


Figure 6.12
Model of Lack of Training

This issue of lack of staff training, have similar views of some scholars. Dillenburger, Mckerr, Jordan, and Keenan (2016), have the view that, having well skills man power is the major key to grantee best quality services, particularly since society affected with quality service usually have a tendency to have greater support requires than other

people in terms of living in daily basis and their mental and physical condition. They further explain that, the staff that have poor training, can have detrimental effects on the services provided and morale, and also leads to staff stress and anxiety in service user (Mckerr, Jordan, & Keenan, 2016). In line with these views, informant A1 has this to say:

“Nevertheless, Most of the staff lacked computer training and skills. There was an in-house training usually organizes by the management for improving staff computer skill, but it has been longer for that to be put in place. Basically, most of the staff were not interested in the training and frequent use of computers. Instead, some were going against the development, due to their ideology of believing in the manual practices). (Personal interview with informant A1)

Informant B1, also explains on the same issue (lack of training) that:

“Well, some staff actually have the required skills that they acquired from private computer training centers, as well, some improved through the daily usage.” (Personal interview with informant B1).

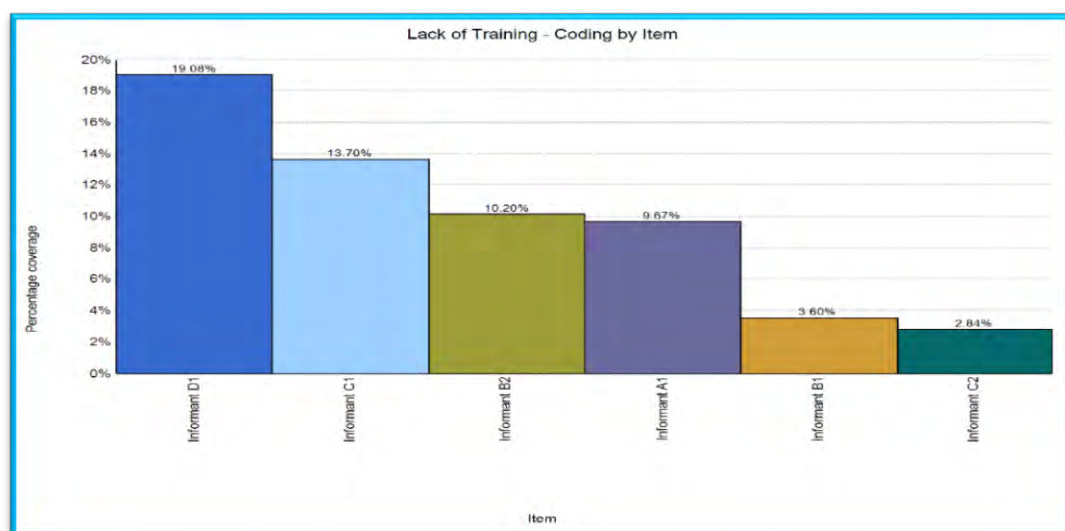


Figure 6.13

Informant responses on the sub-theme lack of training.

The above figure 6.13, describes the sub-theme lack of training and the responses specified that lack of proper and consistent training affects staff performance in public tertiary institutions of Bauchi state, Nigeria. Moreover, the results in percentages, thus, D1 (19.08%), C1 (13.70%), B2 (10.20%), A1 (9.67%), B1 (3.60%) and C2 (2.84%).

6.7.1.6 Sub-Theme 6: Network Problem

The network is dynamic as well as needs update in operation. For sustainable solutions to the growing issue, it has become necessary for both government and private sector business to invest in information and communication technology. The network services have also drawn substantial attention over the past time, (Perera, Zaslavsky, Christen, & Georgakopoulos, 2014). This view is exactly in line with the expression of some informants:

“Thus, Tertiary institutions are places where internet services are indispensable due its nature. All the staff (academic and non-academic), management and students strongly relied on internet services, for, research, browse, emailing, and downloading purposes. (Informant C1 & D1).

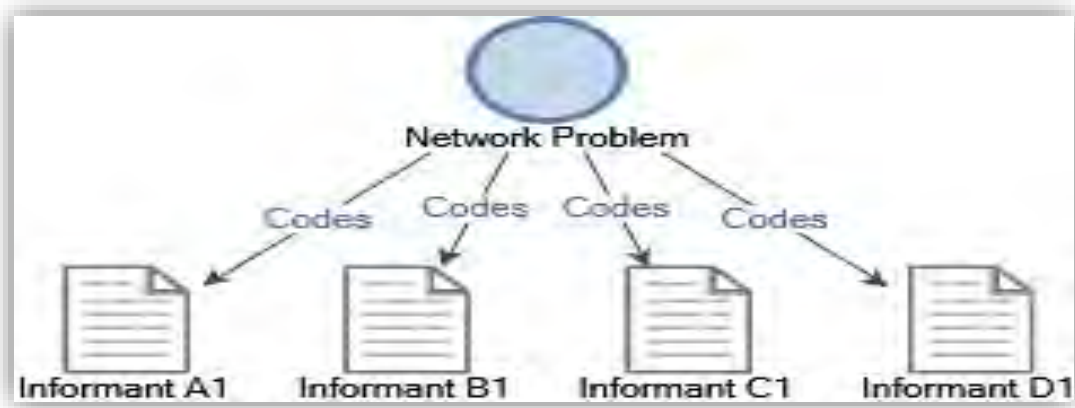


Figure 6.14

Model of Network Problem

Therefore, network problem has several confusions, implications and problems, which occurs due to the careless schedule in the update procedure. Although in traditional networks the problem is obvious, but new opportunities and solutions to this problem has been brought by the software defined networking by splitting of control, and data plane, and as well centralized the control (Wang, Li, & Xia, 2015). Nevertheless, these informants have this to say:

“Certainly, in using internet services there must be a network problem, this is obvious due to certain problems such as, overloads of internet service provider. A number of staff and students using the internet services were as greater as the capacity of the provider. So for this purpose the service must not be speedy. (Personal interview with informant A1 & B1).

Similarly, on the same vain, he further contributed that:

“Meanwhile, sometimes the service providers were not frequently maintained, as well, no technical personnel provided for servicing and repairing. In fact, these are some of the problems associates with network services” (Personal interview with informant A1 & B1).

Same scholars, Wang, Li, & Xia, (2015) have the views that, the major network problem was caused by an update, such as, forwarding black hole, forwarding loop, network policy violation, link conjunction.

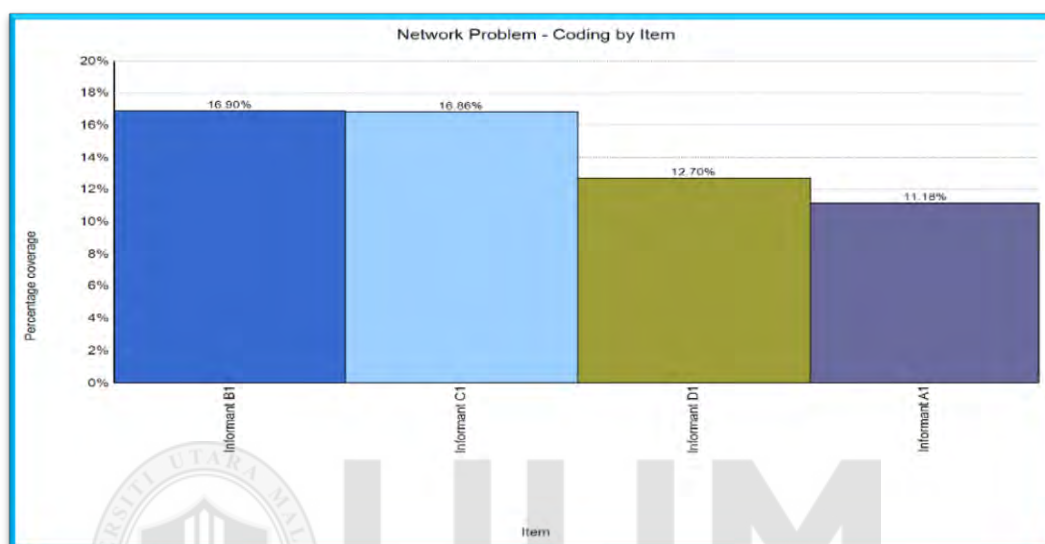


Figure 6.15
Informants responses on the sub-theme Network problem.

Figure 6.15 above, represents the responses of the four interviewees on the sub-theme network problems, with percentage level, such as, informant B1 (16.90%), C1 (16.86%), D1 (12.70%), and A1 (11.18%). The responses point out that network problem affects staff performance in public tertiary institutions of Bauchi state, Nigeria.

6.7.1.7 Sub-Theme 7: Weather and Structure

Here, a question was asked to know whether poor weather and structure will affect the staff performance in public tertiary institutions of Bauchi state, Nigeria.

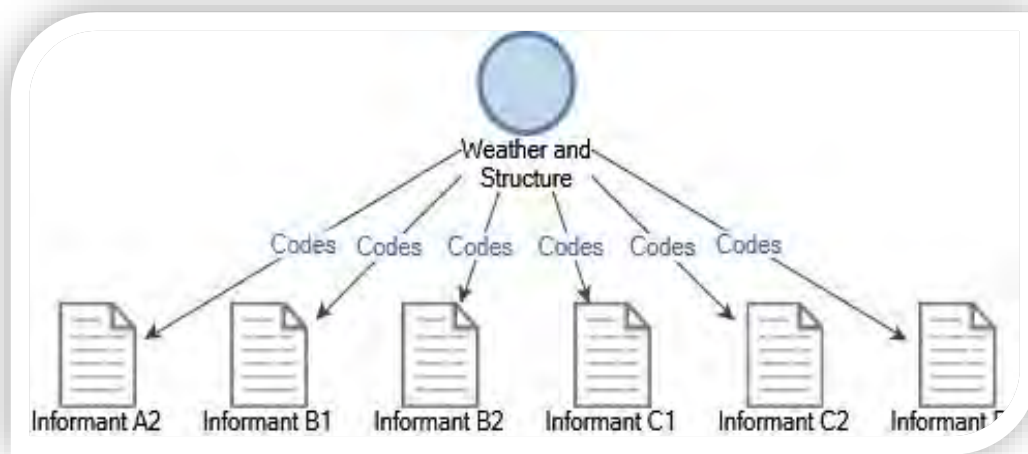


Figure 6.16
Model of Weather and Structure

Based on the conducted interviews, one of the informants observes that:

“Weather is natural, but it differs from one geographical area to another. The current season we are now, the weather we are experiencing is conducive for effective teaching and learning. But during the hot season the weather is terrible, due to the fact that, the sun used to be in its highest degree, whereas, everywhere is full of heat. More so, ventilation is very important factor when we are talking about the weather. Lack of enough ventilation could hinder so many situations.” (Personal interview with informant B1)

Moreover, another informant has this to contribute on a similar issue of weather:

“Undoubtedly, we have enough buildings, and we still need more, due to the nature of the staff and students’ population. Moreover, for the betterment of the institution, it is necessary to have enough building structures. Therefore, we really appreciated the Tertiary Education Trust Fund (TETFund) intervention which makes a lot of efforts Nigerian tertiary institutions, such as universities,

colleges, polytechnics and mono-technics” (personal interview with informant C2)

The sub-theme weather/structure that explains by the informants is in line with the views of some scholars who articulated that, physiological comfort and information about a particular area can be utilized for zonal planning for warming up systems in a place that are vulnerable to sickness that are related to weather/climate. So also the raining season, is often connected with diseases associated with water. Particularly in the southern Nigeria, whereas heat-related sickness in the northern such as meningitis and during the dry season in the middle belt (Sawa & Buhari, 2011). The weather has also turned into a global concern due to the recent concerns for the effects of great climate and increased growth in most nations, particularly, in the developing nations where welfare and health infrastructure is not adequate to cope with informed cases of weather-related disease and mortality (Lin et al. 2011; Raihan, & Aitken, 2011; Eludoyin 2013; Eludoyin & Adelikan, 2013; & White-Newsome et al., 2011). Whereas, one informant has similar views to add:

“Really, we have very a very conducive weather, especially during the winter period where the weather is very cool. The cooler season of a particular year is winter in polar as well as the temperate zones. It does not transpire in most of the tropical zones. It usually occurs after season and before spring in every one year. When in the northern hemisphere it is winter, inversely, in the southern hemisphere will be summer and vice versa. But during the dry season the sun is in its highest degree, everywhere is hot. But with the availability of air conditioning the environment would be favorable to the staff and the ICT facilities to function properly.”(Personal interview with informant C1).

Whereas, another informant has explained that:

“Actually, we have more than enough and modern design structures. The buildings are enough to present for the purpose of accreditation exercise and enough for all the activities needed for, such as, lectures, workshops, seminars, conferences, research, consultations etc. Nonetheless, I think, with the series of TETFund interventions, all the newly and the preceding buildings were currently in use. We have enough lecture halls, lecture theatres, laboratories, libraries, Administrative blocks and e-library”
(Personal interview with informants A2, B2 & D2).

6.7.2 Theme 2: Strategy for Improving Staff Performance.

Considering the research objective provided for this study, the developed themes, and interviewees’ opinions, on the emerged themes, strategy for improving staff performance were supported with details from the interviewees’ difference of opinion to the best of their efforts. Consequently, this serves as a relationship between this objective and subjective opinions of the interviewees, as shows in figure 6.17 below.

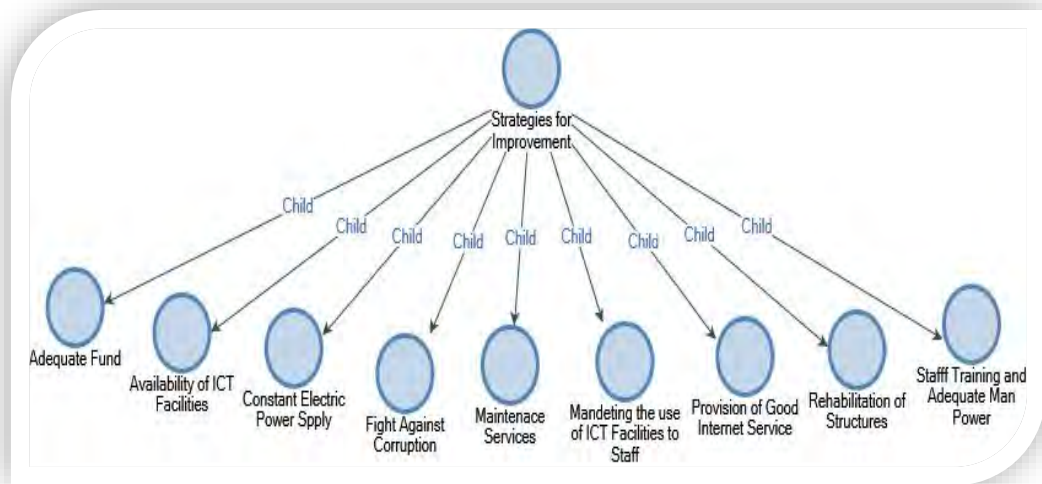


Figure 6.17

Theme 2, Model of Strategy for Improving Staff Performance

The theme, strategy for improving staff performance has emerged with nine sub-themes, such as, adequate fund, availability of information and communication technology's facilities, constant electricity power supply, fight against corruption, maintenance service, mandating staff to use information and communication technological facilities, provision of good internet service, rehabilitation of structure, and staff training/adequate man power.

6.7.2.1 Sub-Theme 1: Adequate Fund

Adequate funding is the sub-team one under theme two, the strategy for improving staff performance in public tertiary institutions of Bauchi state, Nigeria, for this study. It comprises of seven informants, such as, informant A2, B1, B2, C1, C2, D1 and D2 respectively, as displaced in figure 6.18 below.

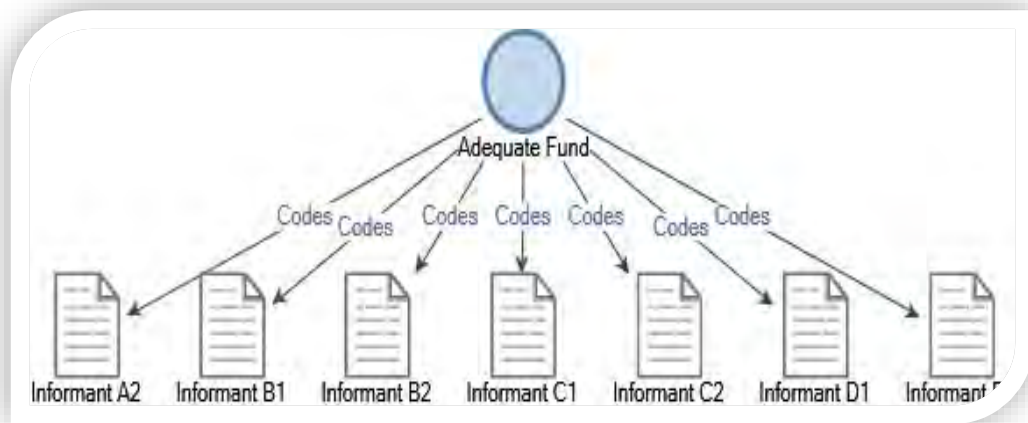


Figure 6.18
Model of Adequate Fund

Funding is necessary for the existence of every institution, particularly tertiary institutions in Nigeria. The success of all higher education institutions, centers with adequate funding, effective administration, and proper planning. Adequate funding has become a necessity for every higher education institution to improve toward achieving its stated objectives (Famade, Omiyale, Adebola, 2015). They further continue that, the quality of life defined by education. It has been judged that the society has been built under the foundation of education. The intellectual high level of success is higher learning and that ensures a greater understanding on appropriate subjects. It also makes available the required foundation of economic growth. (Famade, Omiyale, Adebola, 2015). Here some informants have this to say:

“These potential challenges could only be overcome if the federal government is ready to intervene fully in the affairs of public tertiary institutions. Frequently, the major problem associated with tertiary education has been the funding. For this motive, priority should be given to education, adequate funding

to higher institutions and constant supervision this will improve the standard of education in Nigeria” (Personal interview with informants A2, B1, B2, C1, D1, & D2).

Nevertheless, Famade, Omiyale, Adebola, (2015), also recommended other means of achieving funding in Nigerian tertiary institutions, including all stakeholders in an educational setting, such as, Government, non-governmental agencies, international partners, private sectors, general public, parents and guardians, should be subsidized and support the funding of tertiary institutions in Nigeria. This informant also contributes that:

“Federal government should put interest and more effort in overcoming these challenges. It is the responsibilities of the Government to finance all the tertiary institutions in Nigeria, and stick to ensure that these problems are overcome through constant supervision (Informant B1).

This informant also contributed that:

“Definitely, these challenges needed the intervention of, government, Leaders, society, management, staff and students to be involved in overcoming these challenges”. (Informant C2).

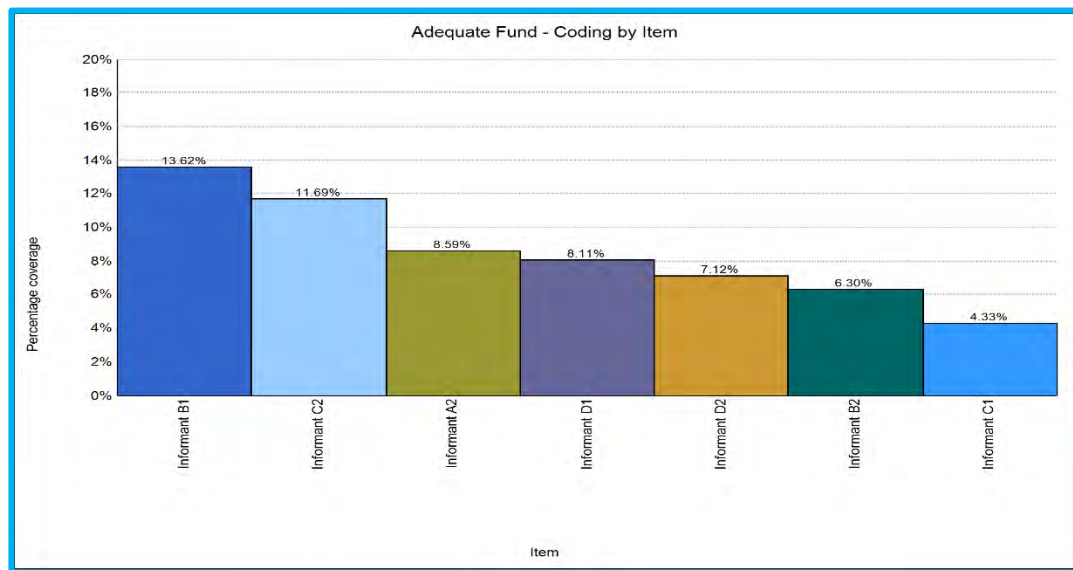


Figure 6.19
Informants responses on the sub-theme adequate fund.

Figure 6.19 is the histogram representing the response of the seven interviewees on the sub-theme adequate funding. Informant B1 (13.62%), C2 (11.69%), A2 (8.59%), D1 (8.11%), D2 (7.12%), B2 (6.30%) and C1 (4.33%). The responses opinion showed that adequate funding will encourage staff performance in public tertiary institutions of Bauchi state, Nigeria.

6.7.2.2 Sub-Theme 2: Availability of ICT Facilities

Availability of ICT facilities is the sub-theme 2 under the theme 2 strategy for improving staff performance in public tertiary institutions of Bauchi state, Nigeria. It includes three informants, thus, informant A1, A2, and C1, respectively, as shows in figure 6.20 below.



Figure 6.20
Model of Availability of ICT Facilities

The use of ICT facilities such as computers, printers, Internet, individual websites, photocopiers, telephones and mobile phones was relatively high among the respondents compared to the use of scanners, facsimiles, video conferencing, and teleconferencing. Also, the women academics used the ICT facilities for various tasks, notably for statistical analyses, word processing, Internet browsing, electronic communication, and searching for information etc. (Olatokun, 2017). In this regards, this informant added that:

“Government should put more efforts in intervening in the affairs of tertiary institutions of the nation. Especially, to constitute a committee that will be responsible for supervising all the institutions and take note of all the problem associates with, ICT facilities, constant power supply, and Internet service provider etc.” (Informant A1).

In support of the above, another informant, further added that:

“If the federal government will give priority to education, and be consistent in allocating adequate fund to the high institutions, it would give a strong room for improving the standard of education in Nigeria. Moreover, with enough funding all the necessary ICT facilities required for improving staff performance, will be achieved and fully utilized”. (Personal interview with informant A2).

Siddiquah, and Salim, (2017), believed that, information and communication technology facilities usage, supports employees’ performance and likewise, computers slow speed, internet service problem, threat of virus, computers poor working condition, load shedding etc. lower performance in the universities.

Informant (C1) added that:

“Federal government should intervene in the affairs of tertiary institutions in Nigeria, especially, by supply more of relevant and modern ICT facilities and accessories; constant power supply and mandate the full utilization of computers in office. This is to improve staff performance”. (Personal interview with informant C1).

Moreover, universities are required to invest more on infrastructure improvement to ensure information and communication technology’s related problems have been addressed in the Nigerian universities (Siddiquah & Salim, 2017).

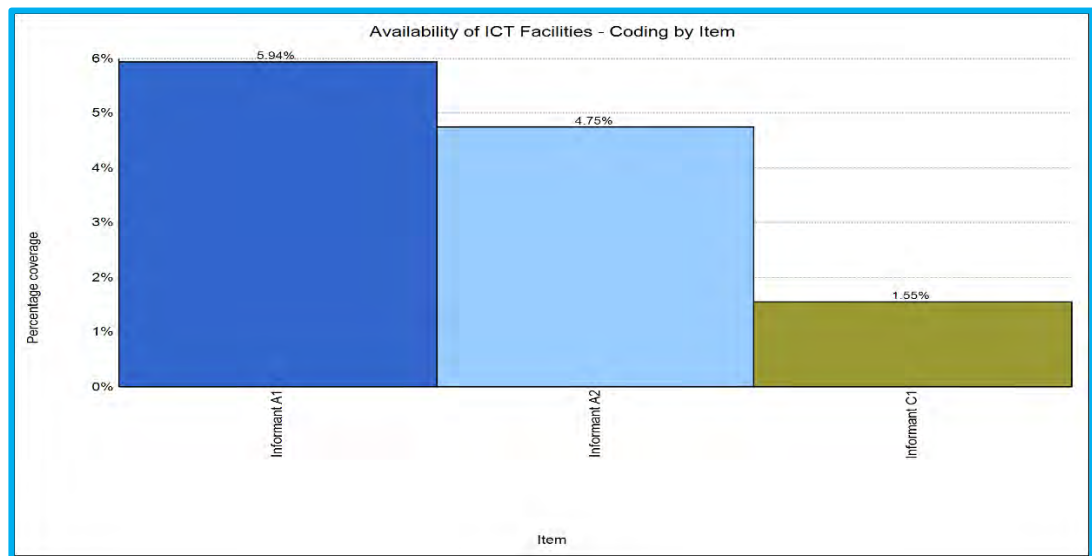


Figure 6.21
Informants responses on the sub-theme Availability ICT facilities.

The figure 6.21 above, shows clearly that most of the informants said the availability of information and communication technology facilities encourages staff performance by carry out their tasks effectively.

6.7.2.3 Sub-Theme 3: Constance Electricity Power Supply

The Sub-theme 3, Constance electricity power supply is under theme two, the strategy for improving staff performance in public tertiary institutions of Bauchi state, Nigeria. It encompasses of five informants, thus, informant A1, B1, B2, C1, and D1 respectively, as displaced in figure 6.22 below.

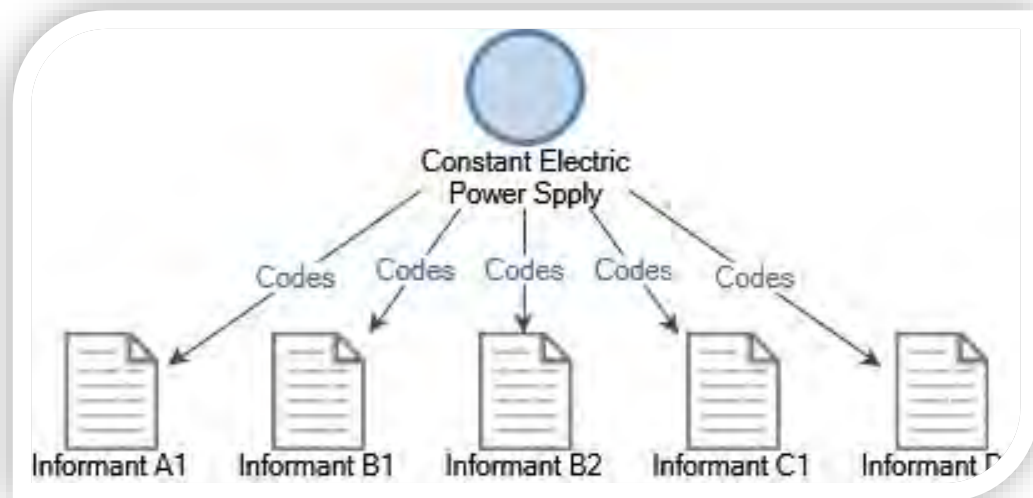


Figure 6.22
Model of Constance Electricity Power Supply

Constant power supply is also necessary for overcoming the problem associated with information and communication technology implementation in tertiary institutions. Power is the major factor that is indispensable to ICT utilization. ICT technicians are also required power for daily maintenance and training other staff to obtain enough computer knowledge, etc. (Informant B1). Life cycle inventories of generating and supplying of electricity are among the major influential factors concerning life cycle assessment outcomes. So, representativeness and consistency of these data are crucial. The area of electricity has been efficient and very important in every institution (Treyer, and Bauer, 2016). Here, one informant contributed that:

“Yet again, the power supply is equally important, because it is the factor that have the highest and the urgent needs in every organizational setting. Because with the constant power supply almost everything will be achieved, successfully. Nevertheless, electricity power is prerequisite in solving current challenges of

employee performance with ICT in the public tertiary institutions” (Personal interview with informant B2).

Federal Government should intervene in the affairs of tertiary institutions in Nigeria, by ensuring Constance power supply, adequate fund, (Informants A1 & C1). In support of the above, another informant has this to contribute:

“The solutions to challenges of power supply, Nigerian citizen should ensure they voted for good and exemplary leaders. However, community leaders also should be honest and reliable. The federal government, therefore, should provide enough funding to ensure a constant power supply has been achieved so as to encourage staff performance in tertiary institutions”. (Personal interview with informant D1).

Informant D1, added that, constant power supply is the key factor that can be put into consideration, if it means to fully utilize information and communication technology facilities and henceforth, encourage staff Performance.

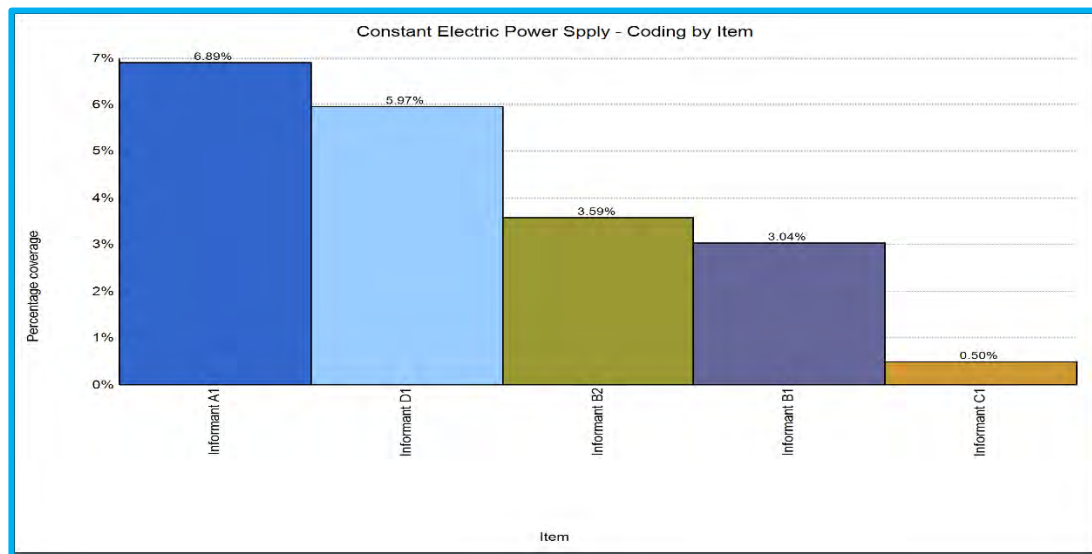


Figure 6.23
Informants responses on the sub-theme, electricity power supply.

The figure 6.14.1 above, displays openly that most of the informants have the opinion that, Constance electricity power supply will encourages staff performance using ICT facilities in public tertiary institutions in Nigeria.

6.7.2.4 Sub-Theme 4: Fighting Against Corruption

Figure 6.24 below illustrates another sub-theme, under theme two, for the research question of this study: fighting against corruption in public tertiary institutions of Bauchi state, Nigeria. It includes two informants, such as, informant A1, and A2 respectively.

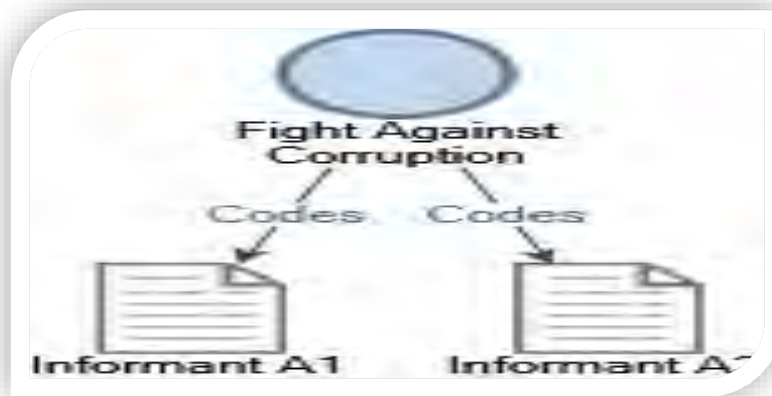


Figure 6.24
Model of Fighting Against Corruption

In order to ensure the success in attaining the staff performance in public tertiary institutions, in Bauchi state, Nigeria. There is the need for total eradication of corruption in all tertiary institutions of Nigeria. In view of the above, this informant has this to contribute:

“More efforts has to be made to ensure government intervene in the affairs of tertiary institution of Nigeria, especially, over the issue of corrupt practices. Even if it means the federal government should constitute a committee that will be serving as commission responsible for the war against bravery and corruption and any similar cases associated with that practice. Similarly, recruitment of staff should be based on merit to avoid the consistent corruption issues, which is believed that it has spread widely in the educational system in Nigeria”. (Personal interview with informant A1).

Moreover, in line with the corruption issue in public institutions in Nigeria, this scholar has this to say, in the wheel of progress, corruption is a dog in Nigeria and in the realization of important national goals corruption causes unfulfilled. Regardless of the

huge human and material resources in Nigeria. However, what causes the corruption in the Nigerian public sector are tribalism, societal pressure, nepotism, and low risk-high benefits of involving in corruption etc. (Ijewereme, 2015). Yet again, these scholars, Sergi, and Qerimi, (2015) added that there are two major obstacles which causes serious harm to the socioeconomic development of a given nation, these are corrupt and organizes crime. In view of the above, one of the informants has given a certain solution to fight corruption, thus:

“These potential challenges, particularly corruption in the public tertiary institution in Nigeria could only be overcome, if the federal government is ready to intervene fully in the affairs of the public tertiary institutions and ensure staff recruitment should be based on merit and staff should also be people with integrity so as to push away all wanting behaviors such as: corruption, embezzlement of public fund, selfish interest and many more” (Personal interview with informant A2).

Nonetheless, the above opinion clearly showed that corruption is the major factor that will be eradicated in order to attain the objective and staff performance in the public tertiary institution of Bauchi state Nigeria.

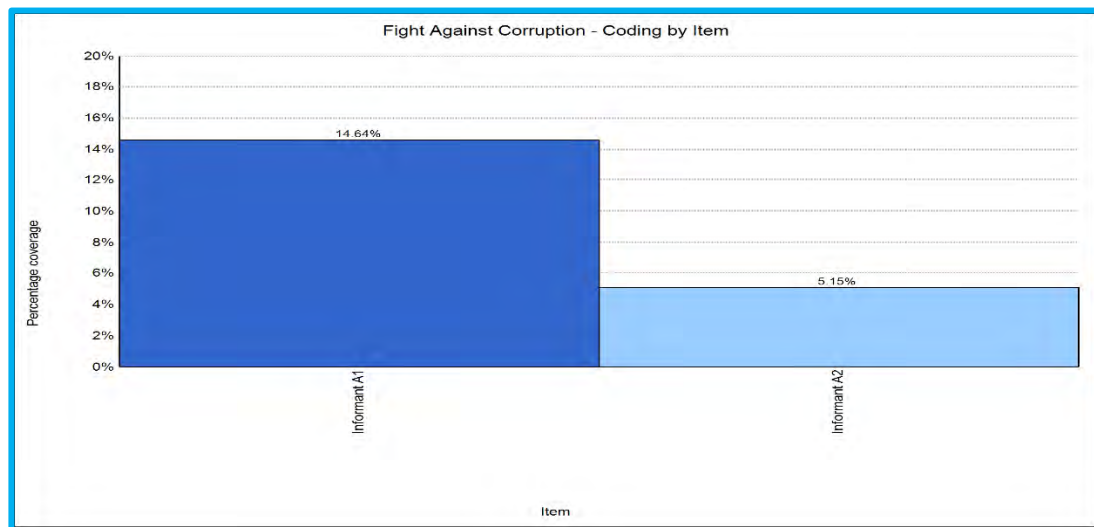


Figure 6.25
Informants responses on the sub-theme fighting against corruption

The figure 6.25 above, shows freely that most of the informants have the opinion that, eradication of corruption will boost staff performance in public tertiary institutions in Nigeria.

6.7.2.5 Sub-Theme 5: Maintenance Services

Figure 6.26 below explains another sub-theme, under theme two, for the research question 4 of this study: maintenance services associated with ICT facilities in public tertiary institutions of Bauchi state, Nigeria. It includes two informants, such as, informant A1, and B1 respectively.

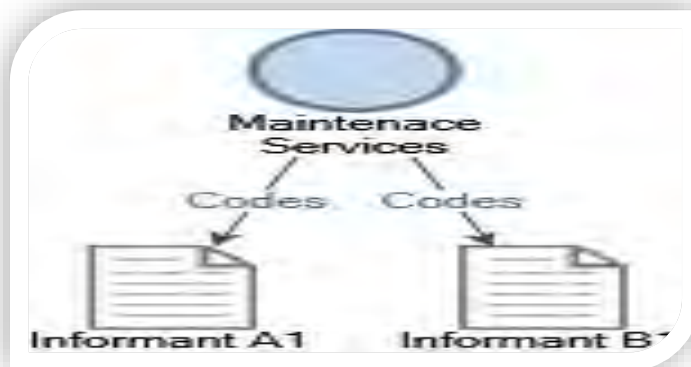


Figure 6.26
Model of Maintenance Services

Some scholars have contributed in line with sub-theme maintenance services, such as, Shohet and Nobili, (2017). They have explained about, the cycle of non-stop progress of the performance and Maintenance of the information and communication technology facilities, as well as the analysis of facilities maintenance, planning and control; and the applicability of the method. They, however, suggested to assess the facilities' maintenance performance, set priority in the maintenance plan, intra and inter-benchmark the performance and efficiency; and establish a policy for the strategic and technical maintenance management. On this issue of sub-theme, maintenance service, this informant has this to say:

“NUC and NCCE should liaise with government to put more efforts through intervening in the affairs of tertiary institution of the country. Especially, information and communication, technological facilities, management and maintenance. However, there is the need for adequate man power, to ensure full maintenance services, and more qualified technicians for the appropriate maintenance supervision etc.” (Personal interview with informant A1)

Similarly, in the same sub-theme maintenance service issue, these scholars' expresses their views that, the advance use of information and communication technology, is comprises the manner in which the facilities are managed and maintained. A high number of methods and techniques have developed in the bright of these advances permitting to have a perfect knowledge about the systems' situation assessment and continuing suitable life, (Guillen, Crespo, Macchi, & Gomez, 2016). This informant also has this opinion to express:

“Solution to these challenges are could be easy, if the Federal Government is serious in overcoming the said challenges. It is the responsibilities of the Government to finance all the tertiary institutions in the nation, and stick to ensure that these problems are overcome through constant supervision. This is some of the reasons why federal government established Tertiary Education Trust Fund (TETFund), aims to create an avenue that will ensure the educational development in Nigeria. ICT technicians are also required for the day to day maintenance and training other staff to get enough computer knowledge” (personal interview with informant B1)

In this regards the above expression obviously showed that good maintenance services will ensure facilities to remain useful for quite a long period of time and encourages staff performance in the public tertiary institutions of Bauchi state Nigeria.

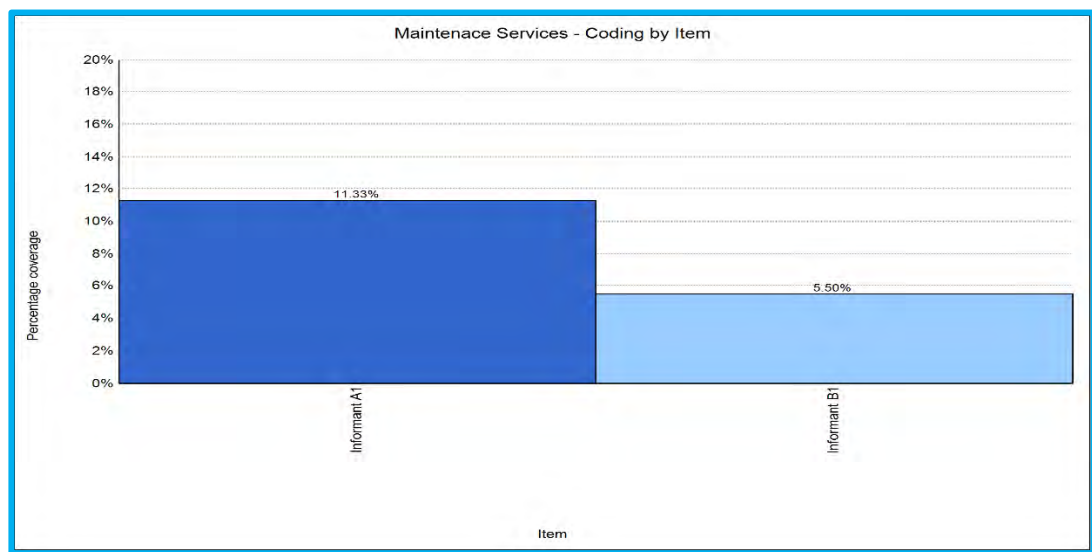


Figure 6.27
Informants responses of the sub-theme Maintenance Services

The figure 6.16.1 above, presents openly that utmost of the informants viewed that, maintenance services will ensure the continuity of the usefulness of information and communication technology facilities and eventually encourages staff performance in public tertiary institutions in Nigeria.

6.7.2.6 Sub-Theme 6: Mandating the use of ICT Facilities to Staff

Sub-theme 6, mandating the use of information and communication technology facilities to non-academic staff in public tertiary of Bauchi state, Nigeria, will inspire them to acquire more knowledge and skills of technological know-how, whereas, eventually, will influence their performance. This sub-theme has two informants that expressed their opinion, such as A1 & C1 as shows in figure 6.28 below.

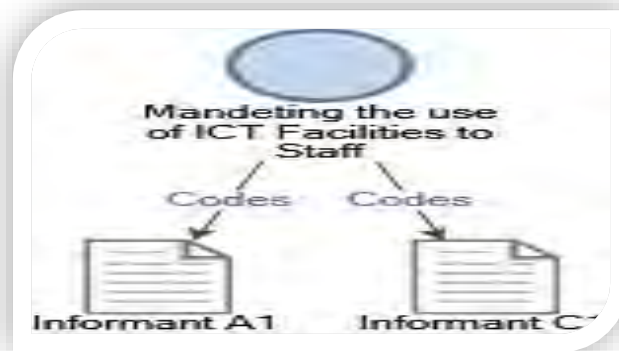


Figure 6.28

Model of Mandating the use of ICT Facilities to Staff

In this study, we have the determining construct that enlightens the non-academic staff's intention of using information and communication technology facilities. To this end, the construct has been included in the research model designed based on technology acceptance model (TAM). Nonetheless, this contrasted with some scholars' views that, customarily, mobile understanding has been more powerfully progressed the informal education settings. Nevertheless, in some years back there has been a rising interest in the incorporation of these information and communication technology facilities in the formal field of education. Among the basic essentials desired to effectively achieve this integration procedure is the acceptance of ICT tools, in tertiary educational institutions (Sanchez-Prieto, Olmos-Miguelanez, & Garcia-Penalvo, 2016). In the same vain, this informant has this to contribute:

“Government should put more efforts in intervening into the affairs of tertiary institution of the nation, by providing yearly grants, and mandates the use of information and communication technology facilities compulsory to non-academic staff, in

discharging their primary responsibilities” (Personal Interview with Informant A1).

These scholars, Tondeur, Van Break, Ertmer, & Ottenbreit-Leftwich, (2017).

Expressed about the link between staff’s belief and their technological tools uses in education. The combination of qualitative outcome integrates the available evidence about this relationship with the ultimate goals being to facilitate the incorporated of technological facilities in education. This informant also contributed that, the federal government intervention in the affairs of public tertiary institutions in Nigeria is highly required, as well as mandating staff full utilization of computer in discharging their primary responsibilities in office. (Informant C1).

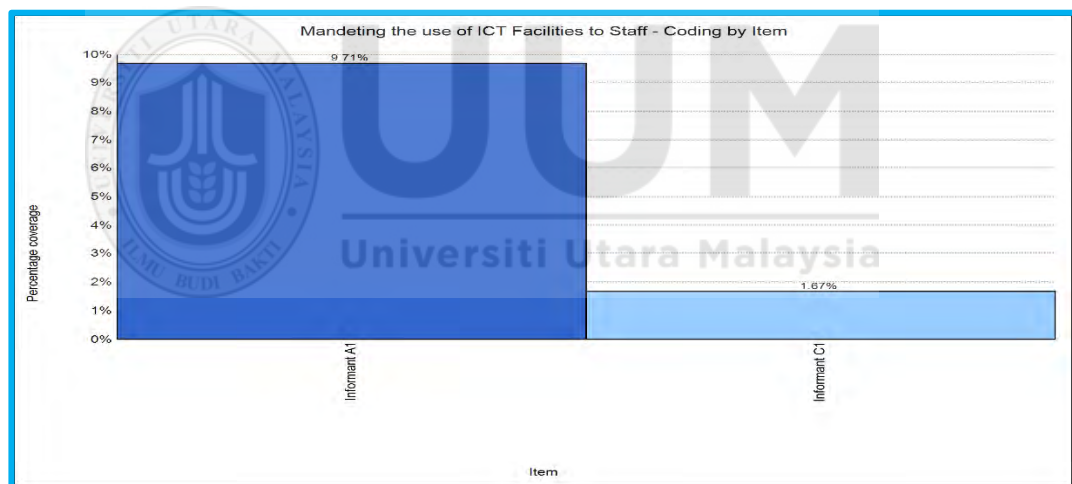


Figure 6.29

Informants responses on the sub-theme mandating the use of ICT facilities to staff.

The figure 6.17.1 above, presents clearly that most of the interviewees have the view that, mandating of the use of Information and communication technology facilities will encourage staff performance in public tertiary institutions in Bauchi state, Nigeria.

6.7.2.7 Sub-Theme 7: Good Internet Service

Provision of good internet services is the Sub-theme 7, under theme 2, the strategy for improving non-teaching staff performance in public tertiary of Bauchi state, Nigeria. Internet service today is becoming indispensable to every institution of higher learning, and it will inspire staff and makes them to be acquainted with more knowledge and skills of technological knowhow, whereas, eventually, will encourage their performance. This sub-theme encompasses two interviewees that are spoken in their opinions, such as A1 & A2 as shows in figure 6.30 below.

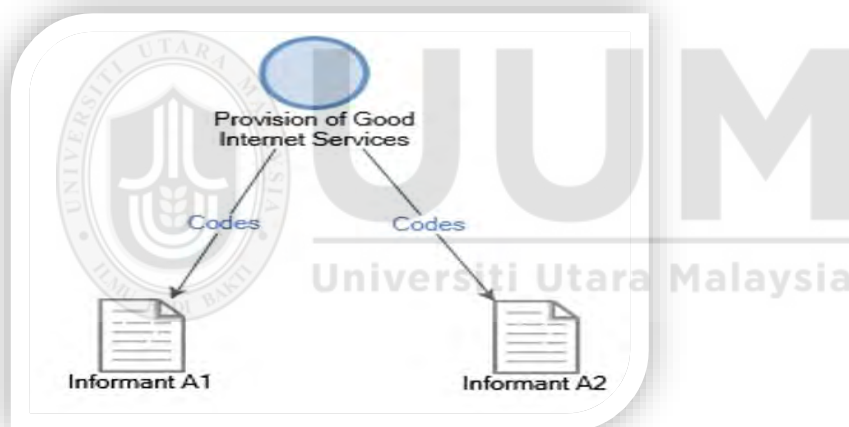


Figure 6.30
Good Internet Service

Provision of good internet services, is in line with the views of some scholars that expressed that, Information and communication technology's improvement has to do with improvement of internet speed, greater access to internet service, adequate information derived from internet services these will ensure intensification in psychological support services, ethnically themed dorms, community centers, thus are

the benefit of internet services, (Skrinjaric, 2014). However, this informant has this opinion to express on the same sub-theme provision of good internet service:

“Government intervention in the affairs of tertiary institutions of the state is essential. Especially, in facilitates, thus, enough ICT facilities, adequate manpower, and constant power supply, and Internet service in particular, which is the key factor that has the pressing need” (Personal interview with informant A1).

In addition to this, Kardefelt-Winther, (2014). Contributes that, addiction in internet services is a speedily growing area of research, receiving researchers’ attention, policy makers and journalist. Similarly, this informant added that:

“...after adequate and constant power supply, an Internet service provider should be in a bigger capacity and powerful that will be enough to cover everywhere in the institutions to enable perfect research for both staff and students and henceforth encourage their performance” (Personal interview with informant A2).

More so, another scholar has contributed that, “Measurement of internet service quality is divided into two groups, firstly, the one that intents to measure the customer satisfaction provider, done by the user, or provider. Secondly, measurement aim is that the supplier or by the seller in regards to the quality assurance delivered by the seller to the supplier” (Haryadi, 2018). These opinions clarified that provision of quality internet service in public tertiary institutions will encourage staff performance.

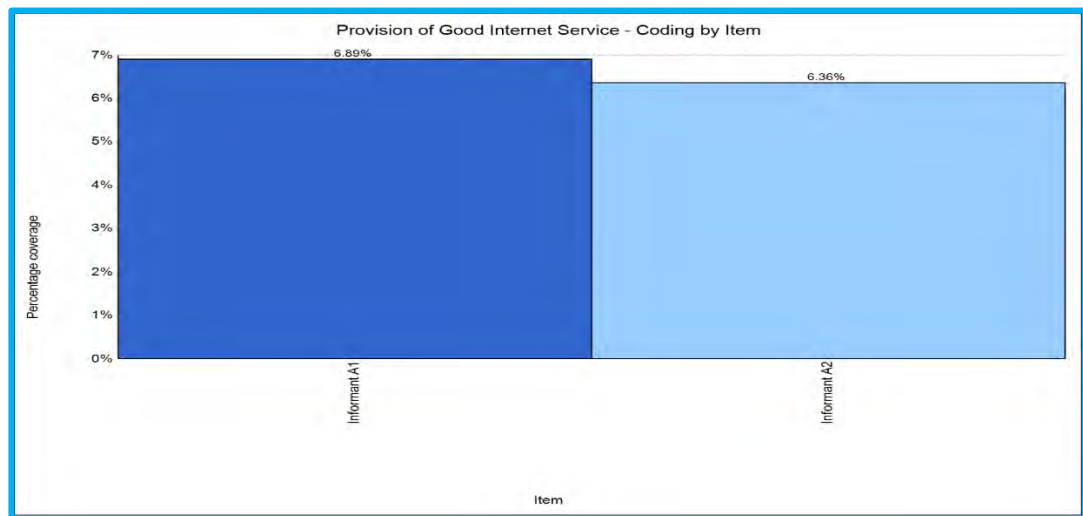


Figure 6.31
Informants responses on the sub-theme Provision of good internet service

The figure 6.18.1 above, plainly represents the interviewees' opinion that, the provision of good internet service will ease and fasten staff's task, whereas, encourages their performance in public tertiary institutions in Bauchi state, Nigeria.

6.7.2.8 Sub-Theme 8: Rehabilitation of Structure

Rehabilitation of structures is the Sub-theme 8, under theme 2, the strategy for improving non-teaching staff performance in public tertiary of Bauchi state, Nigeria. Rehabilitation of structures is essential in every institution of higher learning. This sub-theme is the only sub-theme that has one interviewee that spoken his opinions, such as A1as shows in figure 6.32 below.

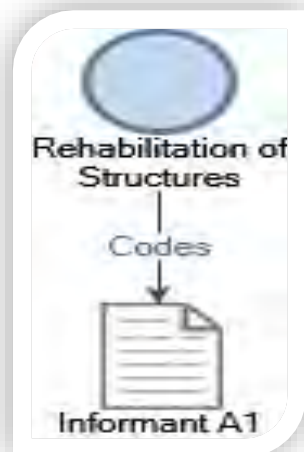


Figure 6.32
Rehabilitation of Structure

Rehabilitation of the existing damaged structures and renovation, have developed as one of the greatest significant construction actions globally. The Money used for building new structures, is not as much as the money used on repairing damaged structures. For example, the recent strikes of the earthquake in countries of Asia, such as Borneo, Malaysia and Japan have called the attention of structural scholars and engineers for the research and development of speedy renovating techniques. (Ma, Apandi, Sofrie, Lo, Awang, & Omar, 2017). In line with these scholars' contribution, regarding the issue of rehabilitation of structure, this informant also tip in, that:

“There is the need for the involvement of Nigerian federal government in the affairs of tertiary institutions. Similarly, consistent yearly grants should be maintained and ensure the development and rehabilitation of structures, widely in the educational sector in Nigeria”. (Personal interview with informant A1).

Nonetheless, on the same vain, these scholars have this to contribute. Munarim, and Ghisi, (2016). Building rehabilitation is an opportunity that is unique to reach great points of environmental performance and decrease the levels of energy consumption needed for its operation. In line with the activities of demolition and construction of new buildings, rehabilitation brings about economic and environmental advantages. Architectural rehabilitation also encourages a significant social capital – the building heritage, when applied to buildings with ethnic significance. This shows that rehabilitation activities have an environmental load in themselves. However, the above expression portrays that rehabilitation of structures in public tertiary institutions will create a conducive atmosphere for non-teaching staff to discharge their primary responsibilities effectively.

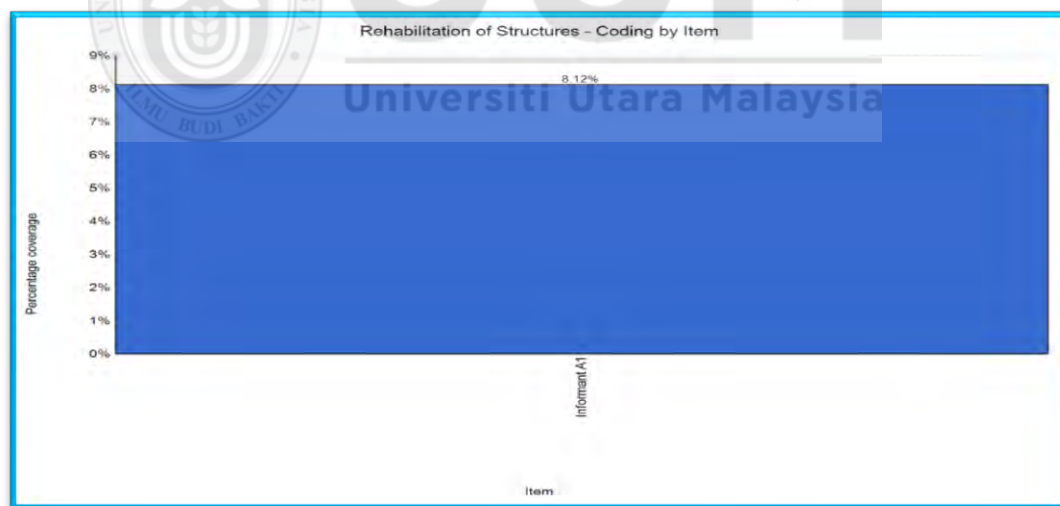


Figure 6.33
Informants responses on the sub-theme Rehabilitation of structure

The above figure 6.33, represents the interviewee's opinion that, rehabilitation of structures will play a very important role in encouraging staff performance in public tertiary institutions in Bauchi state, Nigeria.

6.7.2.9 Sub-Theme 9: Staff Training/Adequate Man Power

The Sub-theme 9, staff training/adequate man power is under theme two, the strategy for improving staff performance in public tertiary institutions of Bauchi state, Nigeria. It comprises of four informants, thus, informant B1, B2, C1, and C2 respectively, as shows in figure 6.34 below.

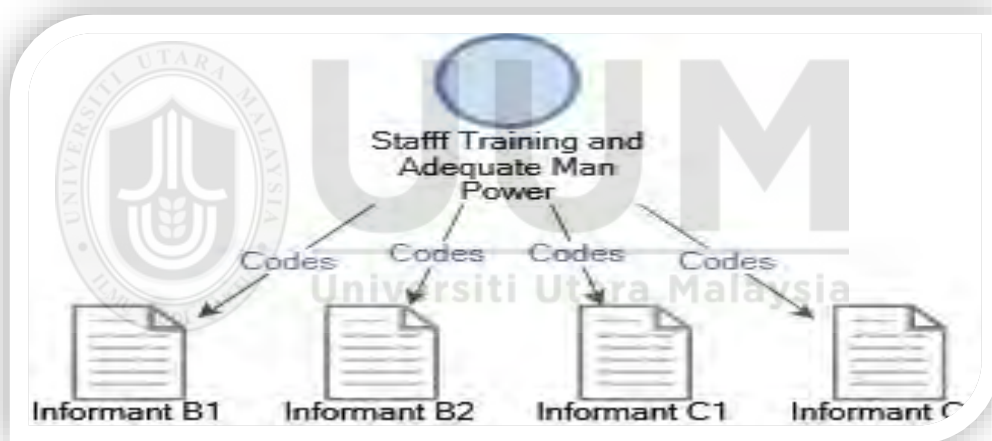


Figure 6.34
Model of Staff Training/Adequate Manpower

The curriculum presently being used to improve technological manpower in various tertiary institutions such as universities, Colleges and polytechnics are quite adequate, relevant content, enough and effective to ensure the staff self-sufficient and enough for performance improvement, (Puyate, 2018). Moreover, another scholar expressed that, Staff training and exchange programs were recommended in knowledge

management, utilization, from the plain ingredient in his study are educational programs, staff and students. Despite the fact that, the government has been blamed by the universities and other institutions for lack of providing adequate facilities for teaching and learning process. (Chiaha, 2016). In view of the above, these informants have this to say:

“There is the need for frequent staff development training, particularly in ICT skills, to enable them more knowledgeable in technology, so as to utilize the computer skills in their primary responsibilities” (Personal interview with informants B1 & B2).

Furthermore, the staff training program efficacy requires to be assessed in relation to the target behaviors of staff. Normally, staff training exercises, heavily rely on didactic procedures or instructional procedures, which send apparent principals’ knowledge” (Kazdin, 2017). In the same lane with the contribution of this scholar, these informants made mention that:

“Apart from the government intervention, the management of the institutions should introduce a policy at their level, to ensure the objectives and goals of the institutions are obtained through staff training, skills and performance”. (Personal interview with informants C1 & C2).

Nonetheless, service quality is concerned with adequate, skilled, and trained manpower. The quality of service in a facility is as a result of the trained personnel, adequate manpower and adherence to guides lines of the organization” (Neogi, Khanna, Chauhan, Sharma, Gupta, Srivastara, & Paul, 2016). Nevertheless, the above

opinions and expressions portrayed that staff training and adequate manpower in public tertiary institutions will improve non-teaching staff performance.

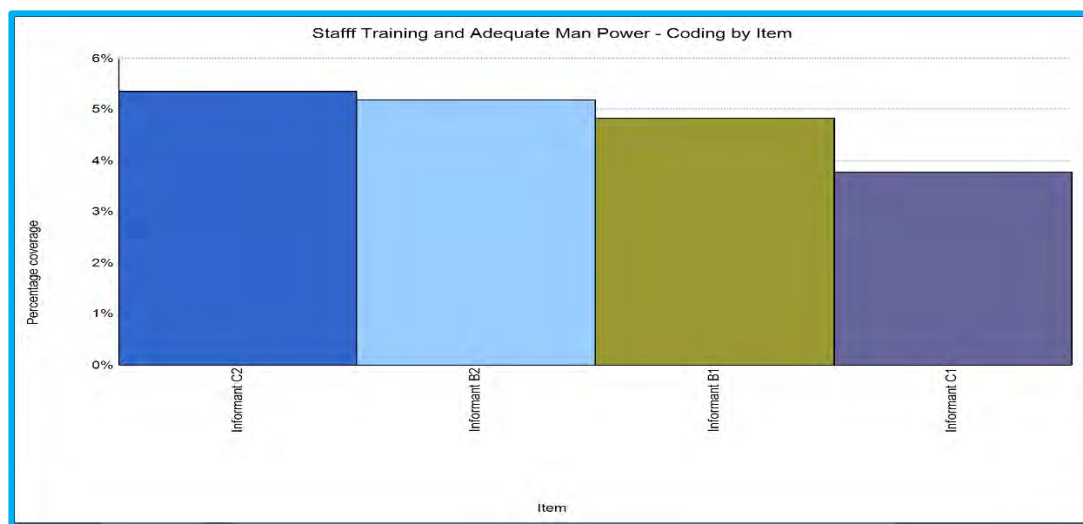


Figure 6.35
Informants responses on the sub-theme staff training and adequate manpower

The above figure 6.20.1, represents the informant's views that, staff training and adequate man power will play a starring role in encouraging staff performance in public tertiary institutions in Bauchi state, Nigeria.

6.8 Summary

In line with research questions three and four of this study, this chapter dealt with the presentation and analysis of qualitative data. This chapter presented steps of data analysis, interview protocol, demographic description, of the participants and thematic analysis. One of the emerged theme regarding potential challenges of information and communication technology adoption in public tertiary institutions of Bauchi state, Nigeria, has seven sub-themes. Include, the problem of computer literacy, corruption,

electricity power supply/generator fueling, inadequate ICT facilities, lack of training, network problem, and weather/structure. On the other hand, the provision of adequate requisite facilities is the theme emerged as a strategy for improving the potential challenges. The sub-themes are: adequate funding, availability of ICT facilities, constant electricity power supply, fighting against corruption, maintenance service, mandating the use of ICT facilities to staff, provision of good internet service, rehabilitation of structures, and staff training and adequate manpower.



CHAPTER SEVEN:

SUMMARY, DISCUSSION AND CONCLUSION

7.1 Introduction

In line with research questions, objectives, and the extant literature, the previous chapter dealt with presentations and analysis of both quantitative and qualitative data. However, in this chapter, a summary of the findings, major findings discussed in line with the literature, and its research implication and practice are presented. It also makes available the future research direction and offered conclusion finally.

7.2 Summary of Findings

The study is targeted to examine both quantitative and qualitative methods to study staff performance using information and communication technology facilities in public tertiary institutions of Bauchi state, Nigeria. The study projected causal influence of six independent variables (PU, PEU, ITU, ATU, SI, and AU) on dependent variable staff performance (SP), in line with research questions one.

Based on research question two, mediating starring role of actual use (AU) of information and communication technology facilities in the relationship between five independent variables (PU, PEU, ITU, ATU, and SI) and the dependent variable staff performance was proposed. In this respect, sixteen hypotheses were formulated and tested empirically. Based on this study's objective, the results shown that all the six independent variables such as, PU, PEU, ITU, ATU, SI, and AU were having positive and significant influence, on the staff performance, the dependent variable. The

findings supported hypotheses H1, H2, H3, H4, H5, and H6. The results presented that the mediating effect of actual use in the relationship between PU, PEU, ITU, ATU, and SI, and staff performance and henceforth, hypotheses (H7, H9 and H11) were supported. While, hypothesis (H8 and H10), were rejected. Research question two also shows that, the three independent variables (PU, ITU, and SI,) were having positive significant relationship with the mediating variable, actual use authenticating hypotheses H12, H14, and H16. Whereas, two independent variables (PEU, and ATU) presented non-significant relationship.

The objective three of this study required to examine factors with potential challenges of information and communication technology adoption in public tertiary institutions, from the qualitative viewpoint. The numerous implicating factors recognized in the process of analyzing the data collected from the interviewees, the data has been categorized into broader perspectives in this study, such as, computer literacy, corruption, electricity supply/generator fuelling, inadequate ICT facilities, lack of training, network problem, and weather/structure factors, with vast challenges on staff to adopt ICT in public tertiary institutions.

Lastly, objective four of this study targeted at recognizing strategy to the elements, with the prospective challenges for improving the staff performance. Some of the identified remedies, are: adequate funding, availability of ICT facilities, constant electricity power supply, fighting against corruption, maintenance services, mandating

use of computer to non-teaching staff, provision of good internet service, rehabilitation of structure and staff training and adequate manpower.

7.3 Research Question One:

Impact of Perceived Usefulness, Perceived Ease of Use, Attitude towards Use, Intention to Use, Social Influence and Actual use, on Staff Performance. In line with research question one of this study and the developed hypothesized relationships, this section discusses the outcomes of the relationships among six independent variables and the dependent variable, influencing staff to adopt office technology. The independent variables are (1.) Perceived usefulness (2.) Perceived ease of use (3.) Intention to use (4.) Attitude toward use (5.) Social influence (6.) Actual use.

7.3.1 Direct Effect of Perceived Usefulness on Staff Performance

In accordance with the Technology acceptance model theory (TAM). Technology Acceptance refers to the user's willingness to employ technology in their primary responsibilities, as well as the human knowledge which involves tools, materials, and systems, (Teo, 2011). In essences, staff perception about the usefulness of information and communication technology influence, is an important component in adoption decisions. The perceived usefulness of ICT adoption has numerous dimensions that provide non-teaching staff opportunity to determine the usefulness of the ICT facilities for adoption decision.

Perceived usefulness in the perspective of this study refers to the degree to which (staff) perceived the effectiveness of the ICT facilities on adoption in their primary responsibilities. Perceived usefulness is an important evaluation technique a staff would like to use in order to evaluate a new system in making decisions (Renko, & Druzijanic, 2014). The variable concerns with assessing perception of the usefulness to have straight decision of adoption. Moreover, evaluating perceived usefulness of the non-teaching staff take a proper decision of adoption, determines by how the perceived the progress and encourage their performance in their primary responsibilities. Information and communication technology Users' adoption, according to the technology acceptance model (TAM), is determined by perceived usefulness, and accordingly, presumed to determine staff attitudes towards using the technology in their institutions, (Hamid, Razak, Bakar, & Abdullahi, 2016). Perceived usefulness, in general consensus is the correlation of the use of technology. This prompted us to make hypotheses that all dimensions of the perceived usefulness would positively related to beliefs about the usefulness of technology facilities to staff for their performance improvement, (Davis, 1993, Peter et al., 2005; Valkenburg & peter, 2007).

The findings of this study, in conformity with the hypothesis 1 (H1), established positive significant relationship between perceived usefulness of ICT facilities and staff performance at ($\beta = 0.571$; $t = 4.70$, $p < 0.00$; $f^2 0.260$). The results of this study have a contradiction with certain literatures that stated non-significant relationship between perceived usefulness and adoption of technology (Park & Chen, 2007)

whereas agree with the stream preceding studies that shown positive and significant effect of perceived usefulness on the aim to adopt related technological facilities, (Wang, 2018; Neves, Mesdaghinia, Eisenberger, & Wickham, 2018; Rehouma, & Hofmann, 2018)

In line with our expectation, the results of this study established that staff with great perception of acceptance of technology facilities on limited basis have the greatest propensity to improve their performance. As a placing the projected technology, facilities, adoption with the chance to confirm the operational modules of ICT, staff view of straggling ICT adoption on limited basis encourages decision to adopt the technological attributes, (Renko, & Druzijanic, 2014)

Perceived usefulness, from the adoption viewpoint, is a device that provides support and influence staff to adopt technological attributes (Rezaei-Moghaddam & Salehi, 2010; Rogers, 1985). Perceived usefulness of ICT adoption can be persuaded as cognitive and psychological ability to the implementation of the ICT facilities capable of encouraging staff freely technology interaction in an actual event. Perceived usefulness of ICT adoption, finds its means to stimulate non-teaching staff to adopt ICT facilities for their effective performance. Furthermore, perceived usefulness of ICT adoption can be understood as an avenue in which non-teaching staff would be empowered with previous skills and experiences to handle the technological facilities when it comes to actual utilization. Therefore, it is a way through which the performance of the non-teaching staff could be boosted.

7.3.2 Direct Effect of Perceived Ease of Use on Staff Performance

Perceived ease of use on the other hand, as one of the elements used to describe the user adoption and the process of decision making is referring to the degree to which non-teaching staff perceived the outcomes of using ICT facilities could be easy to achieve. Ease of use is a kind of perception of the staff that forecast result of using the technological attributes as easy to be accomplished.

The findings of this study established significant positive relationship between perceived ease of use of ICT adoption and the staff performance at ($\beta = 0.098$; $t = 2.10$, $p < 0.02$; $f^2 = 0.288$). The findings are in line with existing literature that established positive and significant relationship between perceived ease of use and adoption (Edmunds, Thorpe, & Conole, 2012; Sun, & Zhang, 2006; Almahamid, Mc-Adams, Al-Kalaldeh, & Motaz, 2010). Furthermore, this study has perfectly matched with (Davis, 1989) who established that perceived usefulness and perceived ease of use, are the determinants of information and communication technology users' adoption and presumed to determine staff attitudes towards using the technology in their institutions.

The results revealed that the higher staff' perception of ease of using ICT adoption the greater the adoption level advising that the higher staff perceived results of using the technology as being a good experience and clearly sufficient to influence their adoption decision (Moore & Benbasat, 1991). It can be concluded that from the results staff with a greater perception of the findings and experience of using the anticipated

ICT adoption the higher their intention to use the ICT facilities in the institutions. In this situation, the direction of research is effective staff performance in tertiary institutions using ICT facilities. Igarria and Iivari (1995) postulated that high complexity is linked to low perceived ease of use

7.3.3 Direct Effect of Intention to use on Staff Performance

The psychological intention of the staff to use new technology is very essential adoption variable. Staff' perception of intending to use technology influenced their cognitive thinking to adopt. Therefore, intention to use as a significant variable of adoption, provides awareness about individual staff adoption decisions. Nevertheless, in line with this study, the intention to use is defined as staff' perception and cognitive self-approval to adopt ICT facilities for improving their performance.

In conformity with the model of this study, it has been assumed that intention to use has a causal effect on staff performance (H3). The path analysis of this study has transported support for H3 that intention to use is a predictor of staff performance. The result reveals that intention to use is an important predictor of staff performance using ICT adoption at ($\beta = 0.117$; $t = 2.42$, $p < 0.01$; $f^2 = 0.011$). Based on this statistical analysis, it can be identified that staff performance is affected by the causal effect of intention to use. The findings followed the preceding studies that found intention to use as an important predictor of technology adoption (Davis 1986; Davis 1989). Intention of individuals to carry out a particular behavior is hinged to both theories of planned behavior and theory of Reasoning Action. So intention involves aspects of

motivation that have emotional impact of the behavior. It is also worth the lengths to which an individual is prepared to attempt the struggles he/she is scheduled to apply so as to display place in behavior Ajzen (1991).

The results of this study shown that intention to use is a predictor of staff performance ($\beta = 0.117$; $t = 2.42$, $p < 0.01$; $f^2 = 0.011$). This finding agrees with the existing literature that found intention to use as the greatest causal predictor of ICT adoption at the interaction point use positive significant correlation between intention to use and technology adoption (Maruping, Bala, Venkatesh, & Brown, 2017). The findings established hypothesized statement (H3) which projected positive influence of intention to use on staff performance. The findings portrayed that increase in the staff's intention to use technological facilities to increase his/her performance using the ICT facilities ($\beta = 0.117$; $t = 2.42$, $p < 0.01$).

The construct intention to use, which joins the combined view of the complexity of TAM and TRAs' variables (Shareef et al., 2011) are the predictor of ICT adoption. The more staff intended to interact with the ICT facilities, the more likely they develop competent to adopt. In another term, when staff felt having psychological and technological intention to use ICT facilities, the most probable increase their performance. In this case, staff performance using ICT facilities increases with the increase in the intention of staff to use ICT facilities.

Moreover, it could be assumed that if a staff believes that he/she has the intention of using ICT facilities, he/she will improve his performance. Thus, the causal relation of intention to use and staff performance has a robust theoretical base. It is perfect that, intention to use is in conformity with those beliefs of progressive attitudes toward ICT adoption, which in turn affect staff performance. Intention to use has a positive relationship with staff performance both directly and indirectly through the mediating effect of actual use. When non-teaching staff believe that they have full intention to interact with ICT facilities, they perceived the advantage of improving their performance using the technology.

7.3.4 Direct Effect of Attitude toward use on Staff Performance

According to this study attitude toward use is defined as an emotional reaction that expresses staff amount of preferences toward using proposed technological facilities, as being acceptable and reliable means of improving staff performance. In accordance with the results of this study, attitude toward the use of ICT facilities has significant influence on staff performance, ($\beta = 0.165$; $t = 3.24$, $p < 0.00$; $f^2 = 0.025$), which authenticated our hypothesized (H4). This finding of attitude toward use of technology is in line with preceding research studies that establish the influence of attitude as a significant determinant of technology adoption (Karavasilis, Vrana, & Zafiropoulos, 2016; Kotamraju & Van der Geest, 2012; Zafiropoulos, Karavasilis, & Vrana, 2012).

Attitude toward use of technology influences staff performance using the ICT facilities and most significantly through perception of the actual use of technology. In essence,

increase in staff attitude toward use of technology interprets into an increase in the perception of actual use of the technology. The significance of attitude toward use in the context of ICT adoption cannot be underrated.

It is significant to examine the ends users' attitudes towards the use of information and communication, technological facilities, before setting a plan to develop any technology. Through attitude strengths and weaknesses can be identified and facilitate technological, infrastructural development, as well as evaluating the technology readiness level. (Al-Emran, Elsherif, & Shaalan, 2016). Moreover, through directing attention and effort, goals have emotional impact on performance. Toward goal-relevant to practice a behavior can permit individual to change their behavior or attitudes toward the use of technology. (Oinas-Kukkonen, & Harjumaa, 2018).

7.3.5 Direct Effect of Social Influence on Staff Performance

Social Influence is a particular factor that plays a significant role in influencing individual behavior and beliefs. According to this study social influence is defined as the degree to which staff perceive influencers and individuals of significance reflect the entities should be as a result of fresh technology, and believed that it will empower him/her to interact with ICT facilities freely (Venkatesh et al. 2003).

The results of this study shown that social influence is a predictor of staff performance ($\beta = 0.165$; $t = 2.94$, $p < 0.00$; $f^2 = 0.043$). This finding agrees with the existing literature that found social influence as the greatest causal predictor of ICT adoption

at the interaction point use positive significant correlation between social influence and technology adoption (Xiao, Witschey, & Murphy-Hill, 2014,). The findings established hypothesized statement (H5) which projected positive influence of social influence on staff performance. The findings showed that increase in the staff's influence to use technological facilities, the increase of his/her performance using the ICT facilities ($\beta = 0.165$; $t = 2.94$, $p < 0.00$).

This study proposed, that staff may employ an ICT because their colleagues and friends are using it, discourse about their helpful experiences with it, and clearly encourage its use. Similarly, when a staff discovers that people around him/her use an ICT tool in an e-learning setting and perceive the profits of its employment, that an individual will be extra willing to use it (Lee, 2010).

Social influence is a predictor of staff intention to adopt and use an extensive technologically innovative attributes. Nevertheless, the behavior intention to use ICT facilities has much to be discovered from social influence of oneself in relation to the information and communication technology (Mathieson, 1991).

We pretended that potential staff whose behavior has been influenced by the importance of computer use, is expected to adopt technological facilities. According to the path analysis, the results have supported the direct effect of social influence on staff performance. The positive significant results of the direct effect of social influence on staff performance supported with the research study (Kim, Kim, Han,

Jackson, & Ployhart, 2017). Nonetheless, other literatures found significant effects of social influence on staff performance (Kim, Kim, Han, Jackson, & Ployhart, 2017). The significant effect of social influence on staff performance may be as a result of staff strong perception of the importance of the use of the information and communication, technological facilities (Arifin, Fontana, & Wijayanto, 2016; Dutton, & Ragins, 2017).

7.3.6 Direct Effect of Actual Use on Staff Performance

In corroboration with the Technology acceptance model theory (TAM). Technology Acceptance refers to the user's willingness to employ technology in their primary responsibilities, as well as the human knowledge which involves tools, materials, and systems, (Teo, 2011). In this regards, staff experience of information and communication technology influence, is an important component in adoption decisions. Actual use of information and communication technology adoption has various ways of providing staff chance to determine the actual uses of the ICT facilities for adoption decision.

Actual use in the viewpoint of this study refers to the frequency of using technological tools in a particular period of time. Moreover, this study view that actual use is the occurrences of a user to apply basic programs of the computer in his office task (Tondeur, Van Braak, & Valcke, 2007),

Actual use is a significant assessment technique that a staff would like to use in order to assess a new technological facility in decision making (Renko, & Druzijanic, 2014). The construct concerns with examining of the actual use to have straight decision of ICT adoption. Furthermore, assessing actual use of the non-teaching staff to take a proper decision of adoption, determine with how they experience the progress and encouraging their performance in their daily task. ICT users' adoption is determined by actual use and accordingly, presumed to determine the staff action toward using the technology in their institutions (Zuiderwijk, Janssen, & Dwivedi, 2015). Actual use generally, is another correlation of the use of ICT facilities. This encouraged this study to make hypotheses that all dimensions of the actual use would positively, related to beliefs about the actual use of technological facilities to staff for improving their performance. (Zuiderwijk, Janssen, & Dwivedi, 2015).

The findings of this study, in line with the hypotheses (H6), recognized positive significant relationship between the actual use of information and communication, technological facilities and staff performance at ($\beta = 0.470$; $t = 3.84$, $p < 0.00$; $f^2 = 0.023$). The results of this study have agreed with the preceding studies that shows positive significant effect of actual use on the aim to adopt certain technological facilities (Zuiderwijk, Janssen, & Dwivedi, 2015; Velazquez, Kaplan, & Monzon, 2018; Siyam, 2019).

In accordance with our anticipation, the findings of this study established that staff that are already using the technological facilities have a higher propensity to encourage their performance. As a placing the likely technological facilities adoption with the

opportunity to confirm the operational models of information and communication technology, staff opinion of straggling ICT adoption on imperfect basis encourages decision to adopt the ICT facilities (Renko, & Druzijanic, 2014)

Actual use, from the adoption point of view, is a device that offers support and influence staff to adopt technological attributes (Velazquez, Kaplan, & Monzon, 2018; Siyam, 2019). Actual use of information and communication technology adoption can be convinced as intellectual and mental capacity to the execution of the ICT facilities skillful of inspiring staff freely use of technology collaboration in an actual event. Actual use of ICT adoption, recognizes its ways to motivate non-teaching staff to adopt ICT facilities for their operational performance. In addition, Actual use can be known as a process in which staff would be empowered with the skills and experiences to handle the ICT facilities when it comes to actual utilization.

7.4 Research Question Two:

Mediating Effect of Actual use in the Relationship between Perceived usefulness, Perceived Ease of use, Intention to use, Attitude toward use, and Social Influence, on Staff Performance. Research question two and the hypothesized relationships established afterwards is set to observe mediating role of actual use in the relationships between perceived usefulness, perceived ease of use, intention to use, attitude toward use, social influence and staff performance using information and communication technology facilities.

7.4.1 Mediating Effect of Actual use, As Determinants of Staff Performance.

The results of the preliminary analysis of this study shown that actual use has the greatest positive significant relationship with the intention to adopt ICT facilities. The findings fit in with the preceding studies that establish actual use as the most significant factor in determining adoption of technological facilities (Venkatesh, Thong, & Xu, 2016; Hermens, Jansen-Kosterink, Vollenbroek-Hutten, 2018). Generally, the important positive relationship of actual use of technological facilities and degree of adoption has been preserved in the Technology acceptance model (Davis, 1983).

Varying findings of adoption variables concerning, perceived usefulness, perceived ease of use, and intention to use, in preceding studies, such as (Literatures, Hamid, Razak, Bakar, & Abdullahi, 2016; Cao & Mokhtarian, 2005; Park & Chen, 2007; Tobbin & Kuwornu, 2011; Adhiutama, 2011; suggested that, non-teaching staff perceived ICT adoption in the case of the constructs may lead to either adoption or not. In other ways, even staff who positively perceived usefulness, ease of use, intention to use, attitude toward use, and social influence of ICT adoption may decide not to adopt it, if they do not perceive its actual use. Remarkably, the results of this study propose that the mediating effect of (Actual use) describes great of unreliable results of the constructs.

In line with the objective two of this study and in tandem with the main statement of technology acceptance models, a rational choice of staff to adopt ICT facilities for

their effective performance is depending on calculating the cost and benefit of adopting. Given our assuming whether a staff intellectual choice to adopt is influenced by numerous features of actual use of ICT facilities, in accordance with TAM/ and TRA, the results show that a staff cognitive decision to adopt ICT is highly influenced by the actual use of ICT Adoption. The results show that actual use of ICT facilities is a main determinant of staff cognitive decision to adopt ICT facilities. In this regard, an increase in staff perception of actual use of ICT facilities increase the tendency of a staff to partake using the ICT tools (Venkatesh, Thong, & Xu, 2016). Furthermore, the findings portray the actual use of ICT facilities as a key element with robust mediating properties enable of relocating the effects of perceived usefulness, perceived ease of use, intention to use, attitude toward use, and social influence, toward influencing staff decision to adopt ICT facilities.

At the prompt of this study, numerous areas of actual use of ICT facilities nested information and communication technology tools as determinants of staff cognitive choice to adopt ICT. Domains of actual use of ICT adoption, in addition, social-benefits, time saving and hazard avoidance are measured (Moore & Benbasat, 1991) which influence staff cognitive decision to adopt ICT facilities.

In summary, a staff intellectual decision to adopt ICT facilities is influenced by building actual use of the new technological facilities with the current approaches thus, image enhancement, convenience and satisfaction. For practical perspective, if a staff pronounce ICT adoption to have great costs of staff performance either by

commanding technical hurdles in the adoption procedure or perceived as porous that can temper with the decision of the adoption, the less likely to adopt ICT facilities. On the other way round, ICT adoption is possible to inspire ICT adoption when a staff perceived it to slightly reduce the cost of adoption, brings appropriate information for staff to decide how to adopt and or when the staff feel that the effective performance would be enhanced (Razak, Bakar, & Abdullahi, 2016)..

Appropriateness of the mediating effects of actual use (mediator), in the relationship between the independent variable (perceived usefulness, perceived ease of use, intention to use, attitude toward use, and social influence) and dependent variable (Staff Performance) can be reasonably enlightened in the sense that the independent variables surrounded some properties reflecting related benefits of ICT adoption. Therefore, it can be understood that the actual use of technological attributes, mediates the relationship between perceived usefulness, perceived ease of use, intention to use, attitude toward use, social influence, and staff performance. Since those constructs have some distinguished elements from vigorous areas of the actual use that need to measure the actual use of the technological facilities as a determinant for staff performance.

The developed model established the direct effect of perceived usefulness, perceived ease, intention to use, attitude toward use, and social influence on staff performance routed through actual use of technology (mediator). It is basically clear that actual use has mediating belongings that describes “why” perceived usefulness, perceived ease,

intention to use, attitude toward use, and social influence, influenced to adopt ICT facilities for their effective performance. Looking at the direct effect perceived usefulness, perceived ease, intention to use, attitude toward use, and social influence may moderately be enlightened by the fact that the actual use explains why non-teaching staff view of the constructs influences their adoption choice. Been the mediating role of the actual use variable offers a partial response to the why question, the effect of result revealed that as non-teaching staff perception of usefulness, ease of use, intention to use, attitude toward use, and social influence, increases the chance of non-teaching staff decision, increases as well. The actual use mediator assists to describe why this relationship is being existent.

On the other hand implications, non-teaching staff perception about usefulness, ease of use, intention to use, attitude toward use, and social influence exemplified influential features helping predetermination of actual use of ICT facilities and in turn inspires staff performance. For example, a staff perception of usefulness of ICT adoption is to examine it's in and out in relation to preceding practice as an indispensable to adoption decision. Parallel with the mediating effect of perceived usefulness variable, perceived ease of use of technology is an effort to measure the benefits of new technological attributes (Harmid, Razak, Bakar, & Abdullahi, 2016). Perceived usefulness advocates that individual will be more probable to adopt technological facilities of its benefits are perceived significantly. Behavioral intention to adopt ICT facilities has abundant to be discovered from psychological usefulness

of the technological attributes. Linking social influence with actual use of technology, makes staff psychologically determines their ability to adapt. (Teo, 2011).

The previous proposals therefore are strong evidence that perception of actual use of ICT facilities can be established through the joint rudiments of perceived usefulness, perceived ease, intention to use, attitude toward use, and social influence, and all together effect ICT adoption decisions. Most prominently, a new understanding towards findings reliability is delivered. Furthermore, the proposition gets to relate, right in order of the relationship between the perceived characteristic of ICT decision of adoption, including the rest of the operational research constructs.

Significant findings of mediating effect of actual use recommend that while, staff perception concerning the ICT facilities attitudes toward use and social influence, influence adoption decision, which is determined through perceived usefulness and ease of use of the system. Actual use is a variable that explains the caliber of the relationship between perceived usefulness, perceived ease of use, intention to use, attitude toward use, and social influence variables and staff performance using ICT facilities.

Based on the model of this study, that places the actual use of technology in the center of ICT adoption for staff performance equation delivers best understanding of why the opinion of the technological facilities as well as operational constructs influence staff to adopt ICT facilities for their performance. A staff is indirectly involved in

comparative decisions on the projected ICT adoption in the light of effectiveness, suitability, and satisfaction as well as the expenses of using it. The evaluation has to do with total benefits received in relation of efforts and time require to operate (Hall, 2004). Staff cognitive judgment to improve their performance using ICT facilities will be influenced if at all a staff perceives a desirable advantage of the proposed ICT facilities, in the light of perceived usefulness, perceived ease of use, intention to use, attitude toward use, and social influence of ICT Adoption over the traditional manual paper-based system.

Nevertheless, at the prompt of this study, perceived ease of use and attitude toward use have significant positive relationship indirect effect on staff performance ($\beta = 0.098$; $t = 2.10$, $p < 0.02$; $f^2 = 0.288$ and $\beta = 0.165$; $t = 3.24$, $p < 0.00$; $f^2 = 0.025$, respectively.) Which it increases the likely hood of improving staff performance, but did not support the relationship through the mediating effect of actual use of ICT facilities. Nonetheless, the second model results of this study, have indicated that perceived ease of use and attitude toward use did not have an indirect effect on staff performance through (mediating variable) actual use of technological tools.

In the occurrence of perceived usefulness, staff enjoys the actual use of ICT facilities and subsequently influence their conclusion to adopt for their effective performance. Hence, the hypothesis that actual use mediates the relationship between perceived usefulness and staff performance is fully supported. The results are in line with the preceding studies of influencing adopt, the decision of perceived usefulness and perceived ease of use (Davis, 1989; Schepers & Wetzels, 2007). Finally, therefore, the

model of this study established that in addition to being direct predictors of willingness to adopt; perceived usefulness, perceived ease of use, intention to use, attitude toward use, and social influence are important determinants of staff performance using ICT facilities through actual.

7.5 Research Question Three: Factors with Potential Challenges of ICT Adopt

In the previous sections, we deliberated on how technological facilities, and socio-psychological elements of a non-teaching staff influences their decision to adopt ICT in their primary responsibilities. In this section, in order to achieve the objective of the study, analysis was used for the purpose of answering question three toward discovering the factors with potential challenges of ICT adoption in public tertiary institutions of Bauchi, Nigeria. Research question three was organized in theme one, which have the following sub-themes: Thus, challenges of computer literacy, corruption, electricity power supply & generators fueling, inadequate ICT facilities, lack of training, Network problem and weather/structure, respectively.

7.5.1 Computer literacy

Sub-theme one that emerged from theme one under research question three of this study, dwelled on lack of computer literacy as one of the potential challenges fronting the realization of ICT adoption in public tertiary institutions of Bauchi, Nigeria. The results of the interview revealed that most of the non-teaching staff were lacking computer literacy, which is one of the prerequisites of ICT adoption. The establishment of information and communication technology into the operations of

governmental bodies, particularly in public tertiary institutions was geared towards achieving effective and efficient administrative functions (Henry, 2017).

From the respondents expressed views, lack of skilled staff who can handle the technology effectively is among the challenges of ICT adoption with numerous implications for staff acceptance of technology. In this regards, therefore, inadequate non-teaching staff with computer skills in Bauchi state tertiary institutions is a serious challenge for handles technological facilities.

Moreover, respondents pointed out that great rate of illiteracy on information and communication technology in Nigeria, which is reflected as striking great costs of ICT adoption. The opinions spoken by the respondents agree with the preceding literature, which assumed that illiteracy on ICT negatively have emotional impact on individual attitude to adopt technological facilities, so this signifies that the lower the ICT knowledge the less likely to adopt, technology (Porter & Donthu, 2006).

More so, in general literacy issue, it has been observed that low literacy in technology differentiating characteristics of numerous developing nations (Galimoto, Hamre, Kaasboll, & Sand vand, 2008) is prospective Challenges of information and communication technology adoption in Nigeria. As emotional belief in one capability to interact with ICT facilities, since the effectiveness of ICT facilities will permit staff interaction with technological tools that can be an inspiration to adopt ICT facilities.

Absence of technological skills is capable of reducing interest to adopt ICT (Chen et al., 2011).

7.5.2 Corruption

Corruption is one of the factors that touches good delivery of education in Nigerian tertiary institutions. Usually, most of the officials that are responsible for handling the education finance are corrupt; they are mismanaging the inadequate accumulated resources to education. Therefore, it also discovered that doing favors is one of the factors that touches main delivery in Nigerian education. Another issue of concern is agreeing with executive, they sometimes employed ghost workers, who are there in the voucher but not in person. It is the executive that is sharing the money for their personal uses. Lack of transparency in any organizational settings is part of the corruption. Transparency International, 2013, ranked Nigeria as the world eight most corrupt country (Hardoon, & Heinrich, 2013).

7.5.3 Electricity power supply/Generator fuelling

Problem of electricity power supply/generator fueling is one the major challenged factor in information and communication technology adoption in public tertiary institutions in Bauchi. Electricity power has very significant role to play in ICT adoption. Thus, it has become indispensable to adoption, since without power supply nothing can be in place. Similarly, it is in the absence of power supply that necessitates the use of generator which is equally a challenge due to cost of fueling.

Nevertheless, according to scholars' view point, electricity power is one of the major factors that is indispensable to every nation today, but is always inadequate in most of the developing nations. This is a severe challenge that threatens the development of many sectors, (Mc Carney, Robertson, Amaud, Lorenson, & Liloyd, 2013). One of the respondents revealed that the power supply is not constant, because most of the time the PHCN were not making supplies for a longer period of time, and even if they do would be less than two to three hours. They equally not given any notice when taking up, for that reason, there is the need for a standby generator to serve as an alternative power supply.

In the process of interview data analysis, this study arrived at the decision that costs of electricity power supply and generator fueling as factors affecting staff's rational conclusion to adopt information and communication technology. The greater this factor enforces more costs on ICT adoption, the less possible staff are encouraged from adoption. While in the reversed case, the more staff perceived usefulness and ease of use of these factors, the more possible to adopt ICT facilities.

7.5.4 Inadequate ICT Facilities

Inadequate information and communication technological facilities is among the major factors with the challenges of ICT adoption. Most of the time, the resources allocated to education sector in Nigeria are inadequate to encourage ICT adoption, particularly in Bauchi. The interviews conducted with certain respondents revealed that there is very low income in tertiary education institutions that means the more the

grants, the greater the facilities. For example, research shows that high achieving states devoted their substantial amount of resources to educational sectors (Bowen, 2018).

Similarly, these views come into conformity with the opinion of other scholars, Oye, Lahad, and Rahim, (2014), have the view that inadequate information and communication technology facilities, excess workload, funding were recognized as the key challenges to ICT use sage. Furthermore, the University staff are expected to use information and communication technology facilities to improve performance in discharging their office responsibilities and finds it easy to use. Therefore, the provision of adequate and relevant hardware, software, training and support should be provided by the management. . (Oye, Lahad, and Rahim, 2014).

On the same related issue, in 2014 Global information Technology report, provides an outstanding evidence shows insufficiency and poor Nigerian technological readiness. The report showed that Nigeria ranked 102 out of 148 countries surveyed with digital contented (Bilbao-Osorio, Dutta, & Lavin, 2014). This indicated that on average technological know-how of Nigerian is very low, as a greater percentage of the population lack basic information and communication technological skills. Particularly in public tertiary institutions' staff efficiency in technology has reflective implications of their conclusion to encourage their performance using ICT adoption.

7.5.5 Lack of training

Lack of training is another factor that has the challenge in ICT adoption in tertiary institutions. The results of the interview revealed that most of the non-teaching staff were lacking computer skills which is one of the prerequisites of ICT adoption. Some of the interviewees blamed institution for not organizing in house training to staff from time to time that will improve their computer skills. But lack of interest in the computer knowledge, by the staff and I do not care attitude usually shown by most of them.

Moreover, there is similar views of some scholars, Dillenburger, Mckerr, Jordan, and Keenan (2016), having good skills man power is the major key to grantee best quality services, particularly since society affected with quality service usually have a tendency to have greater support requires than other people in terms of living in daily basis and their mental and physical condition. They further explain that, the staff that have poor training, can have detrimental effects on the services provided and morale, and also leads to staff stress and anxiety in service user (Mckerr, Jordan, & Keenan, 2016). In line with these views, staff without adequate training may not become friendly in dealing with technological attributes.

7.5.6 Network Problem

Network problem is one among the most challenging factors of ICT adoption. This is becoming into concur with a scholarly view expressed that, network problem has several confusions, implications and problems, which occurs due to the careless

schedule in the update procedure. Although in traditional networks the problem is obvious, but new opportunities and solutions to this problem has been brought by the software defined networking by splitting of control, and data plane, and as well centralized the control (Wang, Li, & Xia, 2015). In this regards, it signifies that the higher the network problem, the lesser the staff interest to adopt technological attributes.

Nevertheless, in the same vain, one of the respondents reveals that, actually internet service is not always strong, because most of the time there were network problems due to overloading the internet service provider. The number of staff and students using the internet are much more than the ratio of the capacity of the provider. So for this reason the service must be very slow. Meanwhile, sometimes the service providers are not frequently maintained, since there were no technical personnel provided that will rectify and repairs the problem of the service providers. Same scholars, Wang, Li, & Xia, (2015) have the views that, the major network problem was caused by an update, such as, forwarding black hole, forwarding loop, network policy violation, link conjunction. So these are some of the problems associates with network problems that can affect the staff cognitive decision to adopt information and communication technological facilities.

7.5.7 Weather and structure

Weather and structure is another factor with potential challenges in ICT adoption. Despite the significance of structure on this issue, but due to inadequate resource

allocation to the educational sector in Nigeria, this will indirectly affect the condition of the structure. The view of some respondents on interviews conducted revealed that government allocation in the education sector is very low. The research indicated that quality in education is fully depending on investment in education. So in this regards, lack of conducive weather and modern structures may discourage staff to adopt ICT (Baron, & Petersen, 2015).

Moreover, some scholars who articulated that, physiological comfort and information of a particular area can be utilized for zonal planning for warming up systems in a places that are vulnerable to sickness that are related to weather/climate, such as raining season, is often connected with diseases associated with water, particularly in the southern Nigeria, whereas heat-related sickness in the northern, such as meningitis and during the dry season in the middle belt (Sawa & Buhari, 2011).

The weather has also turned into a global concern due to the recent concerns for the effects of great climate and increased growth in most nations, particularly, in the developing nations where welfare and health infrastructure is not adequate to cope with informed cases of weather-related disease and mortality (He, et al., 2015; Raihan, & Aitken, 2011; Eludoyin 2013; Eludoyin & Adelikan, 2013;, & White-Newsome et al., 2011). For these various natural weather challenges staff can be psychologically affected in the decision to adopt ICT.

7.6 Research Question Four: Strategy for Improving Staff Performance using ICT Facilities

Most of our interview responses expressed respondents' views on how greatest to overcome the potential challenges of ICT adoption in public tertiary institutions of Bauchi, Nigeria. The factors include adequate funding, availability of ICT facilities, constant electricity power supply, Fight against corruption, Maintenance service, mandating the use of ICT facilities to staff, provision of good internet service, rehabilitation of structures, and staff training and adequate manpower. From the in-depth interview conducted, this study deliberated on some ways of improving staff performance using ICT adoption as follows.

In view of the factors with potential challenges of ICT adoption that hindered staff performance in public tertiary institutions in Bauchi, Nigeria, adequate fund, according to the interviewee responses is the popular opinion among the remedy for these challenges. In fact, most of the views revealed that is the most significant factor that sets to overcome the challenges in order to ensure a successful ICT adoption and henceforth influence staff performance.

Moreover, almost all of those interviewed advocated that government should put more effort into the affairs of education sectors, particularly, by providing adequate funding to various Nigerian tertiary institutions. Because, with adequate funding many infrastructure facilities would be available and sufficient enough to provide a conducive atmosphere that will influence non-academic staff perception to adopt ICT

facilities. The above interviewees' expressions were in concurs with Famade, Omiyale, and Adebola (2015), who suggested that, the success of all higher education institutions centers on adequate funding, effective administration, and proper planning. Adequate funding has become a necessity for every higher education institution to ensure improvement toward achieving its stated objectives.

Availability of information and communication technological facilities is the most important factor that would serve as a remedy to the elements that hinder the ICT adoption in public tertiary institutions. Some of the interviewees expressed the view that, if the federal government would give more priority to the education sector, and be consistent in allocating adequate facilities to higher education institutions, it would give a strong room for non-teaching staff to improve their skills in ICT and raise the level of their performance. Moreover, this shows that adequate ICT facilities that are fully utilized, are the necessary requirements and determinants for improving staff performance. Nevertheless, the above views concurred with the scholarly opinion that, information and communication technology facilities usage, supports employees' performance. Likewise, in the reverse case, its slow speed, internet service problem, threat of virus, computers poor working condition, load shedding etc., Lower staff performance in the universities (Siddiquah, & Salim, 2017). This expression described the relevance and proven that information and communication technological facilities influences staff performance in public tertiary institutions in Bauchi state, Nigeria.

Despite the fact that, some interviewees have deeply explained the importance of ICT facilities as a remedy to the challenges of ICT adoption, but the facilities are highly defended on constant electricity power supply, which is indispensable to any organization. This is in line with scholarly view that, electricity power is one of the major factors that is indispensable to every nation today, but is supposed to be adequate in a wide scope of many developing countries. This serves as the remedy to those challenges that threatens the development of many sectors, (Mc Carney, Robertson, Amaud, Lorenson, & Liroyd, 2013). This testified that electricity power supply has an influence on staff performance using ICT facilities.

Similarly, like all the remaining remedying factors to the challenges of ICT adoption, including, fight against corruption, maintenance service, mandating the use of ICT facilities to staff, provision of good internet service, rehabilitation of structure and staff training and adequate manpower, according to the responses received from the interviewees and the scholarly views on the same factors indicated the they have strong influence on staff cogent decision to adopt ICT for effective staff performance. Mckerr, Jordan, and Keenan (2016), have the view that, having well skills man power is the major key to grantee best quality services, particularly since society affected with quality service usually have a tendency to have greater support requires than other people in terms of living in daily basis and their mental and physical condition. In line with structure as one of the most significant factors this instance with justifying the importance of structure, the recent strikes of the earthquake in countries of Asia, such as Borneo, Malaysia and Japan have called the attention of structural scholars and

engineers for the research and development of speedy renovating techniques. (Ma, Apandi, Sofrie, Lo, Awang, & Omar, 2017), this also shows that structure has a starring role to play in influencing staff performance using ICT facilities particularly in public tertiary institutions of higher learning. Nonetheless, if non-teaching staff are a mandated to use ICT facilities in office, this will serve as clear Avenue for improving skill in computer and henceforth to encourage staff in discharging their primary responsibility.

7.7 Theoretical Validation

In an administrative environment, numerous factors motivate staff to adopt information and communication technology in their daily routines, systematic process and scientific tool were some of the basic impetus staff performance being a fundamental approach of scientific management theory. In an understanding of the wave of the growing use of information and communication technology in a global administrative process, many research have been conducted on adoption of technology for individual performance (Park, Kim, Cho, & Han, 2019; Mohammadyari, & Singh, 2015; Abbas, et al., 2018; Red, Nilashi, & Dahlan, 2018). Nevertheless, it has been noticed that very rarely research conducted on the influence ICT adoption in determining the rational selection of staff to adopt, particularly, in public tertiary institutions. This brings interested relationship of, scientific management theory, technology acceptance model, and theory of reasoning action constructs.

Model of this study takes into knowledge influential of ICT adoption to increase staff performance as a function of the degree to which the information and communication technology increase the effective performance of the staff. Therefore, we acknowledge the effective contributions of the theory of reasoning action in influencing the staff perception to adopt technological attributes as well as the contribution of technology acceptance model to staff performance using ICT facilities. The strength of technology acceptance model, lies in the postulation that staff performance is purely on ICT adoption and this adoption is based on usefulness and ease of use. In line with this, Park, Kim, Cho, and Han (2019) explains that the assimilated model (TAM), increases the descriptive control of the final dependent construct, since the technological attributes positively have emotional impact on the users' perception to adopt, which eventually positively influences the users' adoption decision.

According to our findings, once staff perceived ICT adoption not useful or very difficult to associate with, the less likely to adopt. Therefore, ICT adoption is probable to encourage staff performance if a staff perceives it useful and easy to relate, makes available appropriate information for staff to be encouraged to adopt, and feels that it is very relevant and easier to improve their performance. Studies of technology adoption stated that, numerous hypothetical representation was established towards describing two of person's psychological plan in utilizing technological facilities as well as real individual psychological utilizations of technological facilities (Venkatesh et al. (2003). This can be deduced that perceived usefulness, perceived ease of use, attitude toward use and social influence can create intention to use and positive

expectation from the intention to use would lead actual usage of the ICT among staff of the tertiary institutions. Davis (1986) anticipated TAM as the standard representation of information system in thinking of an individual in utilization of technology and factors related to the adoption of computer services.

According to the findings of our hypotheses supported by the in-depth interviews, intellectual perception of staff recommended preference in using ICT facilities. This is equivalent to perception of attractive facilities of ICT as capable of improving effective performance, accuracy, record keeping, saving time and efforts, as well as comfort in use, these presented the technological attributes as devise of enhancing staff performance as postulated by Technology Acceptance Model.

Furthermore, there are corresponding codependent relationships between the credibility of ICT facilities and intention to adopt to the level that ICT facilities along cannot influenced staff decisions without indispensable intention to adopt. A study conducted on elements affecting individual adoption of technology suggests that impact of ICT facilities influencing staff performance, is less when relates to the role of intention to use (Harris, Mills, Fowson, & Johnson, 2018).

Within the ground of this theoretical statement and despite the variability of adoption favorite of staff centered on efficiency and performance, it is hoped that ICT adoption in tertiary institutions in Bauchi, Nigeria, in corresponding with intention to adopt would lead to increase adoption decision and in the long run, staff performance. The

findings of this study validating the basic postulations surrounded in the scientific management theory, Theory of reasoning action and Technology acceptance model.

Considering the evidence offered in this study, the digital divisions in user-friendliness and affordability of technological tools suggest that ICT adoption can be a device of increasing staff performance when considering as additional to the existing ICT adoption as a total replacement until the digital distributes ends and unequal access become a relief.

At this study's instant, quantitative analysis of factors influencing staff performance using ICT adoption, as well as examining other elements, challenging ICT adoption from a qualitative viewpoint, recognized inter-theory, correlation between management based theory, socio-psychological theory, and technological theory. Thus, scientific management theory, theory of reasoning action and technology acceptance model. Technology acceptance model offering sufficient playing ground for clarifications of determinants of individual performance using the integrative opinion of scientific management theory and the theory of reasoning action.

Hence, the integration of TAM, TRA and scientific management theory SMT has a strength of explaining conceptual of this study, because TAM postulates that perceived usefulness, perceived ease of use and attitude towards use are related to ICT usage. While, TRA postulates that social influence is related to ICT usage. In this quest, scientific management theory postulations relies on the adoption of scientific tool such

as ICT. However, ICT is a means to staff improvement as its usage is an ends to staff performance, therefore, the integration of these adapted theories would help in explaining the model of this study.

7.8 Theoretical Contributions

Evaluation of individual cogent decision to improve his/her performance using ICT facilities adoption in public tertiary institutions as a sub-set of e-government and e-administration as an undeveloped research area. More so, staff performance in relations to ICT adoption is a research area that permit diverse use of research and theories (Holden & Karsh, 2010). Therefore, considering the direction of this developing research area, this study established relationships between management based theory (Fredrick Tylor, 1911), and theory of technology adoption (Davis, 1986), as well as the theory of socio-psychological discipline (Fishbein & Ajzen, 1975). The combination of these theories increases in our understanding the role played by management variable, technological variables and socio-psychological variable as determinants of staff performance. This reflected the relevance of the models and theories in explaining staff performance using ICT facilities in public tertiary institutions of Bauchi Nigeria. Nevertheless, the study established the relationships between administration discipline with models and theories of management, technological and socio-psychological fields.

Concentrating on appropriate theoretical standpoint to a reasonable explanation of individual behavior, this study added to the body of knowledge through combined

technological facilities (Moore & Benbasat, 1991). Technology acceptance model variables (Davis, 1986), scientific management theory variable (Fredrick Tylor, 1911) and Theory of reasoning action variable (Fishbein & Ajzen, 1975). In this study, research model and findings have significant contribution to theoretical understanding of the elements that affects individual decisions to adopt ICT facilities for his/her effective performance. This is seen as the additional expressing the power of integrating scientific management, socio-Psychological factor, technological attributes, and with the centrality of the starring role of actual use of technology in the equation of the technological facilities as the determinants to staff performance through ICT adoption.

Lessening from the theoretic base within combined view of cogent decision, we develop a theoretic framework combination of scientific management theory, theory of reasoning action as well as the technology acceptance model. Presenting mediating role of actual use of technology in the relationship between technological constructs supported by the construct of socio-psychological theory.

One more contribution, this study creates a brief set of variables as well as predictors of staff performance using ICT adoption. By means of mediation of actual use, the main variables perceived usefulness, intention to use, and social influence shown the strong influence on staff performance. Our model's results recommend the relevant of actual use variable as mediator for improving staff performance. In addition to technology acceptance model constructs, model of this study shows the relevance of

social influence as sound predictive construct for improving staff performance, which is not in preceding technology acceptance models.

Similarly, considering the qualitative approach, the study increased understanding of the factors with the potential challenges of ICT adoption and their remedial factors for improving non-teaching staff performance using ICT facilities, which establish a possible theorizing foundation. Convey together the benefits of research approaches of both qualitative and quantitative; numerous compound features were examined in this study, encompasses of separate components of the technology; managerial as well as socio-psychological factors, that formed an important part of the cogent decision to adopt information and communication technological facilities for effective staff performance. The point that extents literatures on technology focus attention on addressing technological matters separately (Bagon, Gacnik, & Starcic, 2018), this study focus on how Information and communication technology adoption influence non-teaching staff performance.

7.9 Methodological Contributions

Indicating the power surrounded mixed method approach to research in lengthening determinants of individual perception to adopt ICT facilities further than discreet quantitative constructs of SMT, TAM and TRA (perceived usefulness, perceived ease of use, intention to use, attitude toward use, actual use, social influence and staff performance) to comprises of (computer literacy, corruption, electricity power/generator fuelling, inadequate ICT facilities, lack of training, network problem,

and weather and structure), established exclusive results that, otherwise might not be attained if either of qualitative or quantitative approach was only adopted. Likewise, mixed method approach provides a broad view of understanding correlated variables and themes. For instance, analysis of quantitative approach revealed that the constructs of technology acceptance model and Theory of reasoning action are the major predictors of staff performance. This results had been further determined and detailed in the results of qualitative approach, where the remedy of the challenged factors influenced staff performance.

To provide the willing for further understanding of the determinants of staff performance, empirically the study examined and authenticated the relationship Between technological facilities, predicting variables as effective factors that have an effect on individual cogent choice to adopt ICT facilities for their effective performance. Eventually, the study jointly utilized the significance power of SPSS, PLS-SEM and NVIVO 11softwares, which served as unusual practice in the meadow of public administration.

7.10 Practical Contribution

In the perspective of practical contribution, this study can be a profitable guide and suitable instrument for researchers, policy makers, as well as practitioners in understanding the role of technological facilities towards motivating the non-teaching staff performance. In view of the detail discussion on technological, socio-psychological and infrastructural factors affect individual perception and decision, the

study can be a practical reference in the direction of effective administration policies that desires to make best use of the benefits of effective staff performance in tertiary institutions of higher learning in Nigeria and other nations with same features. Henceforth, the study offers an important policy guide in planning, design, formulation as well as implementation of strategies for a various, steady and productive tertiary education system.

This study, therefore, establishes a practical fact on the importance of Socio-psychological, technological attributes that are striving towards social influence and technology acceptance model constructs of determining non-teaching staff performance using ICT adoption. Yet, the study is a perfect model to assist universities, colleges, and polytechnics' administrators in coming out with strategies for ensuring different tertiary education institutions structure with non-teaching staff advancing to the greater hierarchy in their respective disciplines. Going with this argument, the composition of non-teaching staff shall attain diversity, impartiality, stability, steadiness and equity in Nigerian tertiary education institutions.

At this stage, therefore, management of tertiary institution in Nigeria, and stakeholders of other education departments, may come up with strategies to make use of Technological and socio-psychological attributes in determining non-teaching staff performance. More so, as significant factors to staff performance, non-academic staff should be inspired to make effective use of technological facilities as well as socio-psychological factors that promote their capability in progressing and improving their

staff performance particular through Salary, promotion, status, staff training and development, which will help to rise general staff efficiency and smooth office running (Hartley, 2018).

In view of the discoursed qualitative and quantitative determinants of non-academic staff performance, tertiary institutions management, and other stakeholders from various units, may comprehensive designing programs that would reinforce administrative volume and a satisfactory atmosphere in implementing these findings, in achieving non-teaching staff effective and efficient performance, in the Nigerian tertiary institutions. As well, it is an empirical examination that observes technological facilities as determinants to staff performance; the non-academic staff unions of tertiary institutions and other administrative organizations in Nigeria may discover this study significant in developing technological and socio-psychological variables towards realizing staff performance.

7.11 Limitation of the Study

There are certain limitations of this study, thus, quantitative respondents were chosen from the non-academic staff of public tertiary institutions, excluding non-academic staff of the private tertiary institutions. This shows that there is an absolute exclusion of the opinion of non-teaching staff of the private tertiary institutions in Bauchi state, Nigeria, even though they have similar issues, characteristics, challenges, and environment. The results cannot be generalized to all non-academic staff that are

working in both public and private tertiary institutions in Nigeria due to their differences in nomenclature.

Furthermore, in the qualitative method, the study was limited only a small sample of eight respondents. Equally, the interviewees were selected from few institutions; did not cover all the federal and state universities, colleges of educations, Polytechnics and mono-technics in Nigeria. Since the same results may not be obtained, if the interviews were conducted with the larger samples or even the whole populations of non-teaching staff of all the tertiary institutions in Nigeria. It might be happened that some more significant variables and themes might be recognized and utilized in the explanation of non-teaching staff performance when the study use bigger size of samples.

In line with TAM theory, five features of technology comprise of perceived usefulness, perceived ease of use, intention to the use, attitude toward use and actual use influence staff performance (Davis, 1986). Considering the opinion that, people with low computer self-efficacy may likely have low confidence in effectively performing computer related functions (Ortiz de Guinea & Webster, 2015), this shows computer self-efficacy as important elements in influence non-teaching staff performance. This proven the applicability of ICT facilities in this study. However, non-inclusion of computer self-efficacy created an existing gap in the model.

7.12 Future Research Direction

This study recommended for future research to give focus on broadens the body of knowledge in the literature on staff performance. So also, as this research has observed the determinants of staff performance in public tertiary institutions in Bauchi state, Nigeria, future research should reproduce the similar model to discover it's an overview of other study perspectives (different from Nigeria) and different kind of organization apart from public tertiary institutions of Bauchi, Nigeria.

Moreover, in order to generate larger, diverse, and more in-depth opinions, more interview samples may be used in respect of non-teaching staff performance. Simply because this study utilizes only eight respondents who may be inadequate in relation to the entire population of non-academic staff in the public tertiary institutions, in Bauchi Nigeria. Therefore, this study established that technology acceptance model and theory of reasoning action variables (perceived usefulness, perceived ease of use, intention to use, attitude toward use, actual use and social influence) have a positive significant relationship with staff performance.

Yet again, in mediating the effect of actual use in the relation between TAM and TRA variables, four variables have significant influence (perceived usefulness, intention to use, actual use and social influence) on staff performance, while only (perceived ease of use and attitude toward use), were found positive but not supported the relationship (insignificant). As a result of this, these two variables can be re-examined again to determine their future direction of staff performance. Nonetheless, this study has

employed only mediation effect, future research should employ both mediation and moderation variables to explain how these independent constructs influence the dependent variable.

Additionally, this study centered on scientific management theory (SMT), technology acceptance model (TAM) and Theory of reasoning action (TRA) variables as determinants of non-teaching staff performance. However, future studies may use additional theory to these in order to determine how independent variable will influence the dependent variable in future research. Similarly, future studies should incorporate computer self-efficacy theory in the model developed this study in order to have more understanding of staff performance using ICT adoption. .

Finally, in the data collection procedure, this study engaged in cross-section research design. Therefore, future research may conduct using either of longitudinal design or time series.

7.13 Conclusion

This study presents all-encompassing picture and empirical on the relationship between information and communication technology adoption and non-teaching staff performance using public tertiary institutions as the focus. The results from the two approaches, quantitative and qualitative findings provided backing for the main theoretical postulations. Obviously, all the research questions of this study have answered through testing 11 hypotheses in which 9 were supported and 2 were not

supported. It likewise succeeded in conducting an in-depth interview with 8 interviewees who contributed in a great measure by expressing their opinions on the challenges and came up with appropriate solutions which, if considered can enhance effective staff performance with ICT adoption in Nigerian public tertiary institutions. For instance, the combination of factors of the scientific management theory, technology acceptance model, and the theory of reasoning action ascertained to have a direct influence on the remedy of the challenges to the ICT adoption for non-teaching staff effective performance. Since the contemporary organizations in general and tertiary education institutions in particular, adopted individual, organizational and governmental resources utilize them in policy formulation and implementation of employees' management, as well as general university system. It has been argued that a human resource management system that is effective and efficient will lead to rational decisions on manpower utilization for enhancing staff productivity and excellent education system at large (Brewster, 2017). This study, therefore, recommended that a holistic approach to ICT adoption has reciprocal benefits to employees (non-academic staff) effective performance and productive organization (tertiary institutions). This reason, is in line with the scholars' opinion that a workplace that practices fairness, equity, justice, proper utilization of resources, and encourages employees' performance, becomes effective and efficient organizations (Hong, Hao, Kumar, Ramendran, & Kadiresan, 2012).

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Appendix A:

Data Collection Permission Letter

	<p>GHAZALI SHAFIE GRADUATE SCHOOL OF GOVERNMENT UUM Kolej Undang-Undang, Kerajaan dan Pengajian Antarabangsa Universiti Utara Malaysia 06010 UUM SINTOK KEDAH DARUL AMAN MALAYSIA</p>	 <p>Tel: 604-928 7751/7752 Faks (Fax): 604-928 7799 Laman Web (Web): www.gsgsg.uum.edu.my</p>
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"MUAFAKAT KEDAH"

Reference No.UUM/COLGIS/GSGSG/P-30
Date: August 8, 2017

TO WHOM IT MAY CONCERN

Sir/Madam,

DATA COLLECTION FOR PHD THESIS

This is to certify that Aliyu Dahuwa Abdullahi (Matric Number: 900899) is a full time PhD student at Universiti Utara Malaysia, Sintok, Kedah.

He needs to collect data for his research paper in order to fulfil the requirement of his PhD programme.

We duly hope that your organization will be able to assist him in getting the necessary information for his research paper.


Thank you.

"KNOWLEDGE, VIRTUE, SERVICE"

Yours faithfully


(**MOHD SUKRI BIN OTHMAN**)
Assistant Registrar,
On behalf of Dean
Ghazali Shafie Graduate School of Government
E-mail: md_sukri@uum.edu.my
Tel: 04-9287752/ fax:04-9287799

Universiti Pengurusan Terkemuka
The Eminent Management University



Appendix B

Summary of Adopted Items

Code	Construct/Items	Cronbach α	Composite Reliability	Sources
SP	Staff performance	0.888	0.915	
SP1	If I use a computer I will be better organized.			Deborah and Higgins (1995)
SP2	If I use a computer I will increase my effectiveness on the job.			Deborah and Higgins (1995)
SP3	If I use a computer I will spend less time on routine job tasks.			Deborah and Higgins (1995)
SP4	If I use a computer I will increase the quality of output of my job.			Deborah and Higgins (1995)
SP5	If I use a computer I will increase the quantity of output for the same amount of effort.			Deborah and Higgins (1995)
SP6	If I use a computer I will be less reliant on clerical support staff.			Deborah and Higgins (1995)
PU	Perceived Usefulness	0.705	0.819	
PU1	ICT helps to improve my knowledge			Mohammadi, (2015)
PU2	ICT helps to improve my performance			Mohammadi, (2015)
PU3	ICT helps to save cost			Mohammadi, (2015)
PU4	Using ICT enables me to accomplish tasks more quickly			Chin et al. (2008)
PU5	Using ICT improves my ability to accomplish tasks			Chin et al. (2008)
PU6	Using ICT increases my productivity			Chin et al. (2008)
PU7	Using ICT enhances my effectiveness in accomplishing tasks			Chin et al. (2008)
PU8	Using ICT makes it easier to do my task			Chin et al. (2008)

PU9	I found ICT useful in my task completion			Chin et al. (2008)
PEU	Perceived Ease of Use	0.368	0.751	
PEU1	ICT is easy to use			Mohammadi, (2015)
PEU2	ICT is easy to learn			Mohammadi, (2015)
PEU3	ICT is easy to access			Mohammadi, (2015)
PEU4	ICT is easy to understand			Mohammadi, (2015)
PEU5	ICT is convenient			Mohammadi, (2015)
PEU6	I found ICT flexible to interact with			Davis, (1989)
PEU7	It is easy for me to become skilful at using ICT			Davis, (1989)
PEU8	My interaction with ICT is clear and understanding			Davis, (1989)
ITU	Intention to Use	0.817	0.868	
ITU1	I intend to use ICT in the future			Mtebe and Raisamo, (2014)
ITU2	I predict I would use ICT in the future			Mtebe and Raisamo, (2014)
ITU3	I plan to use ICT in the future			Mtebe and Raisamo, (2014)
ITU4	I intend to use ICT to assist in my primary responsibilities			Fathema, Shonnon, and Rose, (2015)
ITU5	I intend to use ICT as often as possible			Fathema, Shonnon, and Rose, (2015)
ITU6	I intend to use ICT			Mohammadi (2015)
ITU7	I believed that the use of ICT is available			Mohammadi (2015)
ITU8	I am likely to use ICT in the near future			Mohammadi (2015)

ATU	Attitude Towards Use	0.546	0.767	
ATU1	Working with ICT offer real advantages over traditional method of work			John, (2015)
ATU2	I like using ICT for discharging my responsibility			John, (2015)
ATU3	I think Staff and Students should use ICT in all subject matters			John, (2015)
ATU4	I think ICT can be effectively implemented as working instrument			John, (2015)
ATU5	I think Staff and Students should be using ICT to access relevant materials			John, (2015)
ATU6	I think it is worthwhile to use ICT			Fathema, Shonnon, and Rose, (2015)
ATU7	I have a generally favourable attitude toward using ICT			Fathema, Shonnon, and Rose, (2015)
ATU8	In my opinion, it is very desirable to use ICT in discharging my duty			Fathema, Shonnon, and Rose, (2015)
SI	Social Influence	0.759	0.838	
SI1	People who influence my behaviour will think that I should use ICT			Mtebe and Raisamo (2014)
SI2	People who are important to me will think I should use ICT			Mtebe and Raisamo (2014)
SI3	Staff who uses ICT have more prestige			Mtebe and Raisamo (2014)
SI4	The staff at my institution will be helpful in the use of ICT			Mtebe and Raisamo (2014)
SI5	Staff who uses ICT are considered to be smart.			Maina and Nzuki, (2015)

SI6	Using ICT adds to my status among my Colleagues			Maina and Nzuki, (2015)
SI7	In general, my institution will support the use of ICT			Maina and Nzuki, (2015)

AU	Actual Use	0.831	0.877	
AU1	I use the correct terminology with computer in my office work			Tondeur, Van Braak, & Valcke (2007)
AU2	I use the elementary functions of computer in performing my duties			Tondeur, Van Braak, & Valcke (2007)
AU3	I share my office data with computer			Tondeur, Van Braak, & Valcke (2007)
AU4	I apply operating systems of computer in my office operations			Tondeur, Van Braak, & Valcke (2007)
AU5	I apply basic programmes of computer in my office task			Tondeur, Van Braak, & Valcke (2007)
AU6	I apply safety provisions base on computer in my office operations			Tondeur, Van Braak, & Valcke (2007)

Appendix C:

Questionnaire



Ghazali Shafie Graduate School of Government,
College of Law, Government and International Studies
Universiti Utara Malaysia

Dear Sir/Ma,

ACADEMIC RESEARCH QUESTIONNAIRE

I am a Ph D candidate in the above named Institution, conducting a study on the adoption of Information and Communication Technology (ICT) and Staff Performance in Public Tertiary Institutions of Bauchi State, Nigeria. This survey is mainly for academic usage and as a part of fulfilment for the award of the doctorate degree. The questionnaire is designed to obtain your personal opinion on the above title. Likewise, there is no correct or incorrect answer. You are kindly requested to spare your time and complete this questionnaire form. The answer provided will be utilized with the highest confidentiality and for the purpose of research only. Best regards

Yours faithfully,

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Part two: Staff Performance (Tick/circle where appropriate)

The following statement measures the effect of ICT on the non-academic staff performance in tertiary institutions. Please assess your agreement with the statement below based on the following five Liker scales provided.

Please use this scale to answer the questions below.

Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
1	2	3	4	5

Part two : Staff performance (SP)

SN.	Item(s)	SD	D	N	A	SA
1.	If I use a computer I will be better organized.	1	2	3	4	5
2.	If I use a computer I will increase my effectiveness on the job.	1	2	3	4	5
3.	If I use a computer I will spend less time on routine	1	2	3	4	5
4.	If I use a computer I will increase the quality of output of my job.	1	2	3	4	5
5.	If I use a computer I will increase the quantity of output for the same amount of effort.	1	2	3	4	5
6.	If I use a computer I will be less reliant on clerical	1	2	3	4	5

Please use this scale to answer the questions below.

Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
1	2	3	4	5

Part three : perceived Usefulness (PU)

SN.	Item(s)	SD	D	N	A	SA
1.	ICT helps to improve my knowledge	1	2	3	4	5
2.	ICT helps to improve my performance	1	2	3	4	5
3.	ICT helps to save cost	1	2	3	4	5
4.	Using ICT enables me to accomplish tasks more quickly	1	2	3	4	5
5.	Using ICT improves my ability to accomplish tasks	1	2	3	4	5
6.	Using ICT increases my productivity	1	2	3	4	5
7.	Using ICT enhances my effectiveness in accomplishing tasks	1	2	3	4	5
8.	Using ICT makes it easier to do my task	1	2	3	4	5
9.	I found ICT useful in my task completion	1	2	3	4	5

Please use this scale to answer the questions below.

Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
1	2	3	4	5

Part four : Perceived Ease of Use (PEU)

SN.	Item(s)	SD	D	N	A	SA
1.	ICT is easy to use	1	2	3	4	5
2.	ICT is easy to learn	1	2	3	4	5
3.	ICT is easy to access	1	2	3	4	5
4.	ICT is easy to understand	1	2	3	4	5
5.	ICT is convenient	1	2	3	4	5
6.	I found ICT flexible to interact with	1	2	3	4	5
7.	It is easy for me to become skilful in using ICT	1	2	3	4	5
8.	My interaction with ICT is clear and understanding	1	2	3	4	5

Please use this scale to answer the questions below.

Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
1	2	3	4	5

Part five : Attitudes toward Use (ATU)

SN.	Item(s)	SD	D	N	A	SA
1.	Working with ICT offer real advantages over traditional method of work	1	2	3	4	5
2.	I like using ICT for discharging my responsibility	1	2	3	4	5
3.	I think Staff and Students should use ICT in all	1	2	3	4	5
4.	I think ICT can be effectively implemented as working instrument	1	2	3	4	5
5.	I think Staff and Students should be using ICT to access relevant materials	1	2	3	4	5
6.	I think it is worthwhile to use ICT	1	2	3	4	5
7.	I have a generally favorable attitude toward using	1	2	3	4	5
8.	In my opinion, it is very desirable to use ICT in discharging my duty	1	2	3	4	5

Please use this scale to answer the questions below.

Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
1	2	3	4	5

Part Six : Social Influence (SI)

SN.	Item(s)	SD	D	N	A	SA
1.	People who influence my behaviour will think that I should use ICT	1	2	3	4	5
2.	People who are important to me will think I should	1	2	3	4	5
3.	The staff at my institution will be helpful in the use	1	2	3	4	5
4.	In general, my institution will support the use of ICT	1	2	3	4	5
5.	Using ICT adds to my status among my Colleagues	1	2	3	4	5
6.	Staff who uses ICT have more prestige	1	2	3	4	5
7.	Staff who uses ICT are considered to be smart	1	2	3	4	5

Please use this scale to answer the questions below.

Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
1	2	3	4	5

Part Seven : Intention to Use (ITU)

SN.	Item(s)	SD	D	N	A	S A
1.	I intend to use ICT in the future	1	2	3	4	5
2.	I predict I would use ICT in the future	1	2	3	4	5
3.	I plan to use ICT in the future	1	2	3	4	5
4.	I intend to use ICT to assist in my primary	1	2	3	4	5
5.	I intend to use ICT as often as possible	1	2	3	4	5
6.	I intend to use ICT	1	2	3	4	5
7.	I believed that the use of ICT is available	1	2	3	4	5
8.	I am likely to use ICT in the near future	1	2	3	4	5

Please use this scale to answer the questions below.

Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
1	2	3	4	5

Part Eight : Actual use (AU)

SN.	Item(s)	SD	D	N	A	S A
1.	I use the correct terminology with computer in my	1	2	3	4	5
2.	I use the elementary functions of computer in performing my duties	1	2	3	4	5
3.	I shared my office data with computer	1	2	3	4	5
4.	I apply operating systems of computer in my office	1	2	3	4	5
5.	I apply basic programmes of computer in my office	1	2	3	4	5

6.	I apply safety provisions base on computer in my office operations	1	2	3	4	5
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Thank you for your patience, time and effort

SECTION C.

Demographic Characteristics of the Respondents: Please Tick (✓) Only One option.

Gender: 1. Male [] 2. Female []

Age: Below 25 years []

25 – 30 years []

30 – 35 years []

35 – 40 years []

40 – 50 years []

50 and above years []

Experience in Tertiary Education Institution (Generally, not only your Institution)

1. less than 1 year []
2. More than 1 year and less than 3 years []
3. More than 3 year and less than 5 years []
4. More than 5 year and less than 10 years []
5. More than 10 years []

Experience at your present Institution

1. Less than 1 year []
2. More than 1 year and less than 2 years []
3. More than 2 year and less than 5 years []
4. More than 5 year and less than 10 years []
5. More than 10 years []

Non-Academic administrative position

1. Registrar []
2. Bursar []
3. Chief Librarian []
4. Director of works []
5. Director Medical
6. Director ICT Unit []
7. Administrative Officer []
8. Clerical Officer []

Your academic field

1. Social & Management Sciences []
2. Natural Sciences []
3. Applied Sciences (e.g. Engineering, Computing, & ICT) []
4. Medical & Health Sciences []

Experience in ICT

How long have you been using ICT facilities?

1. Less than 1 year []
2. 1 – 3 years []
3. 3 – 5 years []
4. More than 5 years []
5. Not use at all []



Appendix C

Table for Determining Sample Size

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size "S" is sample size.

Sources: Krejcie and Morgan (1970)

Appendix D

Semi-Structured Interview Questions



**Ghazali Shafie Graduate School of Government,
College of Law, Government and International Studies
Universiti Utara Malaysia**

Semi-Structured Interview Questions for
Qualitative Data Collection

NOTE: The main Questions are listed below. However, this is a semi-structured interview and it is anticipated that other questions may be asked based on the interviewee responses.

Demographic Information

Gender: male [☐], female [☐] Age:

Marital status Education level

Computer literacy, Occupation,

Position, State,

Institution,

...

General Questions

1. How would you describe the problem of ICT in relation to staff performance in public tertiary institutions?
 - a. Do have ICT facilities?
 - b. What type of ICT facilities do you have?

- c. Are the facilities adequate to improve the performance of non-teaching staff?
 - d. Are non-teaching staff fully utilising the facilities in their daily routines?
 - e. Do you have good and conducive ICT halls for staff training and utilization?
 - f. How do you find this environment for staff to improve their performance with ICT facilities
2. How would you describe the potential challenges for staff to accept the introduction of fully utilization of ICT in public tertiary institution?
- a. Do you have staff with the computer literacy?
 - b. Do you think the number of staff with computer literacy are enough for the introduction of fully utilization of ICT facilities in office work?
 - c. Do you think this staff can accept the fully utilisation of ICT in office work, without any anxiety?
3. What in your opinion are possible solutions to the potential problems of ICT in public tertiary Institutions?
- i. Supply of adequate ICT facilities to public tertiary institutions.
 - ii. The facilities should be modern type and qualitative.
 - iii. Let all the non-teaching staff have the knowledge of operating ICT facilities through in-house training and workshops.
 - iv. Fully utilisation of computer system should be compulsory, so as to enhance full e-administration in the institutions.
 - v. Enough and conducive computer unit buildings should be provided
 - vi. All the computer units should be provided with standby Generators.
 - vii. Computer Technicians staff should be adequate.
-

Appendix E

Category and Selected Informants

The Category and Numbers of the Selected Informants

/No.	Category	Interpretation	Frequency
1.	A	Staff Aminu saleh College of Education, Azare	Not accessed
2.	B	Staff Abubakar Tatari Ali Polytechnic, Bauchi	2
3.	C	Staff School of Health and Technology, Ningi	2
4.	D	Staff College for Legal and Islamic Studies, Misau	2
5.	E	Staff Bauchi State University Gadau	Not accessed
6.	F	Staff Abubakar Tafawa Balewa University University, Bauchi.	2
Total			8



World Research Cycle



Appendix G

Summary of Themes and Sub-Themes

Summary of the themes and sub-teams

Themes	Sub-theme	Informant
Potential challenges of ICT adoption in public tertiary institution in Nigeria.	• Computer literacy.	3
	• Corruption	7
	• Electricity/ Gen. fuelling	5
	• In adequate ICT Facilities	4
	• Lack of Training	6
	• Network Problem	4
	• Weather and structure	6
Strategies for improving staff performance.	• Adequate fund	7
	• Availability of ICT facilities	3
	• Constant electricity supply.	5
	• Fight against corruption	2
	• Maintenance services	2
	• Mandating use of ICT to staff	2
	• Good Internet service.	2
	• Rehabilitation of structure.	1
	• Staff training and adequate manpower	4
Total		63

Appendix H

Pictures of the Selected Tertiary Institutions

Abubakar Tafawa Balewa University, Bauchi (ATBU) – Main Gate



Abubakar Tafawa Balewa University, Bauchi (ATBU) – Administrative Block



Bauchi State University Gadau (BASUG) – Main Gate



Bauchi State University Gadau (BASUG) – Main Gate



Aminu Saleh College of Education, Azare (ASCOE) – Main Gate



Aminu Saleh College of Education, Azare (ASCOE) – Main Gate



College of Legal and Islamic Studies, Misau (CLIS) – Main Gate



College for Legal and Islamic Studies, Misau (CLIS) – Main Gate



Abubakar Tatari Ali Polytechnic Bauchi (ATAP) – Main Gate



School of Health and Technology Ningi, Bauchi, Nigeria.
(SOH & TECH) – Main Gate



School of Health and Technology Ningi, Bauchi, Nigeria.
(SOH & TECH) – Administrative Block & LOGO



